OCT 28 1924

AMERICAN
# GAS JOURNAL
Established 1859 Pioneer of the Gas Industry

NEW YORK, SATURDAY, OCTOBER 18, 1924


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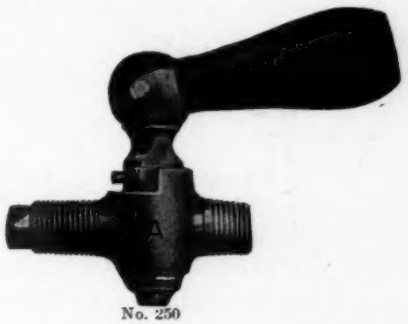

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***Let us help solve your purifying problems***

## GAS PURIFYING MATERIALS CO.

Long Island City, New York

AMERICAN
GAS JOURNAL

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# Fuel of the Future. What Shall It Be?

## XIV. The value of gas as a fuel and its calorific power

*Ismar Ginsberg*

THE two previous articles that have been published in the Fuel of the Future Series were concerned with a description of the different gaseous fuels that are available for industrial and domestic purposes. It is proposed in this article to discuss the principles on which the selection of a gaseous fuel should be made and in particular to develop the real importance of the calorific power of a gaseous fuel and the efficiency with which it can be used in the furnace or in the domestic range, and the nature of the results that are obtained by its application in such fashion.

### The Choice of the Gaseous Fuel

In one of the previous articles in which the characteristics of the various gaseous fuels were discussed, it was stated that the gas engineer, the industrial gas salesman, has but little choice, if any, in the matter of his fuel. He must sell the fuel that his company manufactures, and must do the best he can with it, no matter what disadvantages it may possess or under what handicap he is thereby placed in entering the competitive, industrial fuel market.

It may have been inferred from this statement that the entire situation is one of great inelasticity, of legal rigidity, which cannot yet be overcome. It is true that the state regulates the properties of the gas that is sold to the domestic customer by stipulating that it should contain so many British Thermal Units per cubic foot and that its cost should be in proportion therewith. This regulation would be altogether satisfactory, if the calorific value of the fuel, used as the legal standard, were arrived at scientifically and with due consideration of the results of experiment and practical experience with the use of gaseous fuels. Unfortunately, in most cases it is not, but is a mere heritage from the old candle power standard, translater into terms of heat, or it is just a guess on the part of some individual who is not acquainted with the facts.

### Can a Proper Legal Standard Be Obtained?

The question naturally arises, can the gas company secure a legal thermal standard that will be in accord with the conclusions that have been reached from actual experience as to what kind of gas gives the best results and is burned with the highest thermal efficiency? Some people have gone as far as to say that the gas industry has itself been to blame for having to operate under unnatural conditions which have resulted in its having to make and sell a gas that possesses an artificially high thermal value and a lower thermal efficiency than a lower calorific power gas of considerably less cost.

This is certainly an anomalous situation. It is one which can and must be remedied if the gas industry is to reach the summit of its ambition, the goal toward which it is working, if it is to fulfill the slogan that it carries on all its literature and which it uses as a rallying cry for all who are concerned with the gas industry: "If it's done with heat, you can do it better with gas."

### The Legal Standard and Industrial Gas

There is one peculiar feature of the situation which requires a little explanation. The legal standard, fixing the calorific power of the gas, applies only to gas that is sold to and used by domestic consumers. The commission simply has no jurisdiction in the case. The legal calorific power of the gas does not pertain to the industrial consumer. The gas company is privileged to sell him any kind of gas that it likes.

Of course, with a single distribution system, it is impossible to sell the domestic consumer one kind of gas and the industrial customer another kind. But it is possible, and under certain conditions it should be profitable to arrange a separate distribution system for the industrial consumer. The gas that would be sold to the industrial consumer and

distributed through this system would have a thermal value which would be consistent with best practice. The gas would be cheaper than domestic gas for expensive gas oil would not have to be employed artificially to increase the natural thermal power of the gas distilled from coal, and, furthermore, it would be possible to use other coals than the limitedly distributed gas coal for this purpose.

### A High Pressure Distribution System

Furthermore, this distribution system can be a high pressure system, which would do away with the necessity of having boosters installed in the industrial plants where high pressure gas must be employed. There does not seem to be any doubt but that the distribution of gas under high pressure in the gas mains as they now exist in the average city or town served with gas would result in high losses due to leakage.

Eventually, if such a dual system were installed, it is altogether likely that the authorities would be convinced of the advantages that are to be gained by the use of a gas that contains just the correct number of heat units to burn with the optimum efficiency. Then a single system could be used to distribute to all the cheap, low B.t.u. gas.

### What Relation Has Thermal Value to Quality of a Gas

The principal question in this discussion is the relation that the thermal value of a gas has with its real quality. Is it true, as laymen and many gas men think, that the higher the calorific power of the gas, the better the gas? Or is there a definite relation between thermal capacity and quality which changes after the gas has attained a certain maximum thermal power?

It is very apt here to draw a comparison between thermal power and quality of a gas, and percentage of filler and strength or quality of a rubber product. It may be known that the addition of fillers, cheap mineral matter, such as barytes and the like, to rubber, has an important effect in materially increasing the strength and the mechanical resistance of the rubber. Rubber that contains the proper amount of filler is much superior than the pure rubber. But when too much filler is added, then the strength of the rubber commences to decrease.

### Variation of Efficiency with Thermal Power

In the case of gas it is the same, although here a valuable heat-producing ingredient is added. As the calorific power of a gas increases, from the low values possessed by such gases as producer gas and semi-water gas, the efficiency of the utilization of the heat contained in it increases. This relation, however, does not hold good indefinitely, for when the calorific power of the gas reaches a value of approximately 300 B.t.u. per cubic foot, which is that of an ordinary blue water gas, it is found that maximum flame temperature and best efficiency of utilization are attained. When the calorific power of the gas is increased beyond this point, which can be done by carburation with oil, a fuel is obtained which—true enough—contains more heat value per unit volume of original gas, but which does not give as good results as the lower B.t.u. gas. In other words, what it amounts to is simply this: The gas contains more heat value, but it is not practical to make this additional heat value, which is potentially available in the gas, do more work than the B.t.u. up to a maximum of 300 to 325 B.t.u. There is thus a difference between the available B.t.u. in a gas and the number of B.t.u. that is transformed into useful heat. This applies, of course, to the case of blue water gas

### The Bases of Comparison of Gaseous Fuels

Hence, the B.t.u. is not the sole basis of comparison of gaseous fuels. It cannot be said, without exact definition and limitation, that the greater the number of heat units in the gas the better the gas will be. Other bases must be employed in arriving at the real value of a gas.

In other words, there are really two bases of comparison, one on quantity and the other on quality. The quantity basis we have discussed. The quality basis refers to the utilization of the heat units that are contained in the gas.

In order to study the quality of a fuel it is necessary to consider the conditions that surround its combustion and the more important characteristics of the combustion process. It has been held that the most important of these characteristics are as follows:

1. The British Thermal Units, hence the concentration of heat in each foot of the products that are obtained in the combustion of the gaseous fuel.
2. The theoretical flame temperature of the fuel.
3. The rate at which the flame is propagated.

When a gas is studied from all these angles, including, of course, the concentration of heat values in the original unburnt gas, then a true insight into its true value as a fuel will be gained.

### The Concentration of Heat Values in the Products of Combustion

The concentration of the heat values in the products of combustion that are obtained from burning a gaseous fuel is one of the most important considerations in determining its true heat value. It is of far greater significance than the concentration of the heat values in the original fuel or in the mixture of air and gas before it is burnt. What is meant by this factor is the heat in the combustion gases, per cubic foot, just after complete combustion has taken place and before any of the heat has been dissipated. It must be emphasized here again that the concentration of the heat values in the original gas or its mixture with air is simply a statement regarding the quantity of heat that is contained in the gas. It does not tell anything about its real quality or of the actual results that can be obtained with it.

(Continued on page 1095)

# West Shows Marked Improvement

## The Dangers of Too Much Saving—No Chance for a Boom

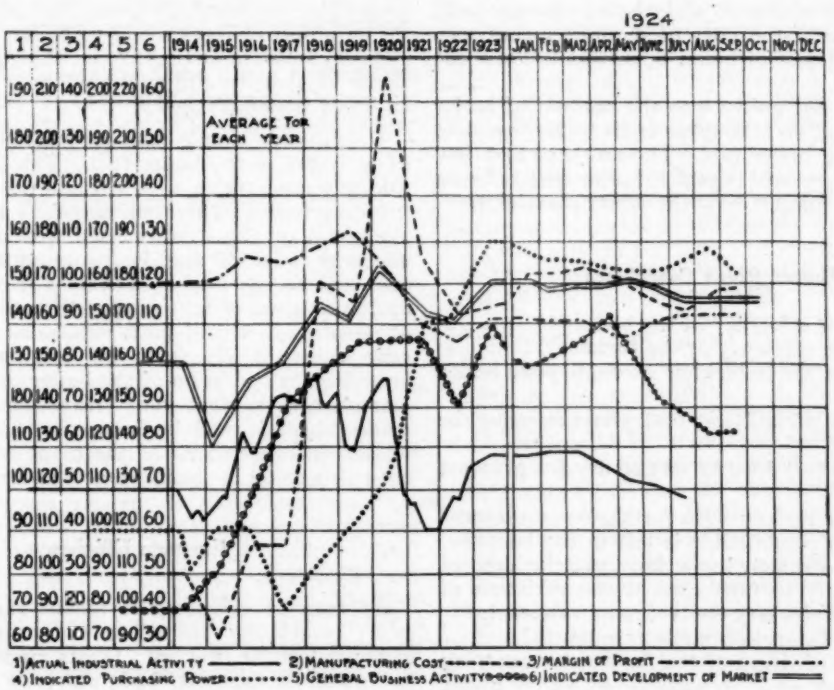
*L. W. Alwyn-Schmidt*

SIGNS of a general broadening of the market situation are multiplying. Just now it is still the West which is feeling the return of the buying movement. But there are also noticeable indications of greater strength in the Eastern industrial centers. The situation, however, although vastly improved, still requires considerable caution. The industrial wage-earner and salaried man have been severely frightened by the sudden break of the market during spring and will require very potent evidence of better times before they start to buy upon a larger scale

There is no doubt that the campaign for greater economies carried on during the war as a war measure, and continued by the savings bank for their own benefit, has taken root and has brought about a habit of frugality, which, while swelling savings banks accounts, has had a depressing influence upon the merchandise turnover. Money invested in loan societies, life insurance and resting in banking accounts does not buy clothing, furniture and automobiles. This money is withdrawn from ordinary circulation. Its accumulation in the banks has so far had no other evident advantage than that of bringing down the discount rate.

### The Money Situation

As nobody needs money, there is nothing gained at present by letting grow the nation's financial reserve and business certainly would be better served if at least part of this money was released for the purchase of merchandise.


1924
1 2 3 4 5 6
1914 1915 1916 1917 1918 1919 1920 1921 1922 1923
JAN FEB MAR APR MAY JUNE JULY AUG SEP OCT NOV DEC
AVERAGE FOR EACH YEAR
1) Actual Industrial Activity
2) Manufacturing Cost
3) Margin of Profit
4) Indicated Purchasing Power
5) General Business Activity
6) Indicated Development of Market

The truth of this is now realized by many students of the economic situation and proposals to accelerate the purchase movement by group advertising are moves in the right direction. But advertising alone cannot break the inertia of the retail buyer. Stronger means are required to bring him into the market.

The lowering of prices by itself is no real inducement to the consumer. To make low prices effective the goods must appeal in style and usefulness to his immediate desires.

### No Chance for a Boom

Until the right policy has been found business will have to be satisfied with such demand as is

(Continued on page 1098)

# *Locating and Reducing Excessive Use of Boiler Fuel in Small Gas Plants

## An Analysis of an Important Matter in Gas Works Operation

*C. L. C. Kah*

Alpena, Michigan

THE boiler plant equipment in small gas plants is comparatively simple and it is not because there is too little knowledge about combustion or the technic of boiler room practice that boiler fuel in the average small gas plant is above what is considered good practice, but rather due to the indifference that is shown to the cost of various small items that go into the cost of manufacturing gas, and of these the cost of boiler operation is the most neglected.

This paper is not going into the technic of boiler room practice, but an attempt is made to show simple ways of reducing boiler fuel. The answers to a few pertinent questions will reveal if boiler fuel is being wasted and will suggest how the waste may be overcome.

### A Boiler Plant Catechism

1. What is the efficiency of the boilers?
2. What is the efficiency of the furnace?
3. How much air is leaking through your boiler settings?
4. How thick should the fuel you are using be fired?
5. Should the fuel fired be wet or dry for greatest economy?
6. Is the grate surface right for highest economy?
7. How much combustible is left in the ashes?
8. Does your fireman know how to take care of the drafts properly to take care of the variation of loads to get the necessary control most efficiently?
9. Is internal inspection made frequently?
10. Is the temperature of the feed water entering the boiler as high as it is possible to get it under given conditions?
11. How much steam is being wasted?
12. What do leakage and radiation losses amount to?
13. Is steam being wasted by inefficient apparatus?

A short discussion of the questions will be made in the order given above.

### Efficiency of Boiler

By the question what is the efficiency of the boiler is meant the ratio of the heat absorbed by the boiler to the heat in the fuel fired. It is not sufficient to know only the pounds of evaporation per pound of fuel fired, for if that is low one would not know whether it was due to inefficiency of boiler or poor fuel. The common boiler fuel used is breeze and that as a rule is of low heat value per pound and usually contains a large amount of moisture, which absorbs heat instead of giving off heat. Oftentimes poor coke yield or high bench fuel has been covered up by unfair charges made to boiler fuel due to excessive moisture in fuel fired. In order to get maximum efficiencies and minimum costs it is necessary to know boiler efficiency.

It is a very simple task to determine the amount of moisture in the boiler fuel. This can be done by taking a fair sample of it, not more than two pounds, grinding it in a coffee mill to pass a ten-mesh sieve. Weight it on the balance used with the calorimeter and heat it to 150 deg. F. for 24 hours and allow to cool and weigh again. The loss in weight divided by the original weight is approximately the per cent of moisture. Breeze may contain as high as 25 per cent moisture. It is to be emphasized that not knowing the condition of the boiler fuel not only unjust charges against your steam generator may be made which it will be impossible to justify, but wastes in other parts of the plant may be covered up which could be easily remedied.

### Furnace Efficiency

By furnace efficiency is meant the ratio of the gases completely burned to the combustible gases generated in the fuel bed. Tests made on hand-fired boilers show that fuel beds act very much like gas producers. The combustible gases being consumed in the space above the fuel bed, which must be deep enough so that the gases are completely burned before they strike the boiler shell, or they will be chilled below the ignition point and pass up the stack unburned. It is noted that $CO_2$ reaches its maximum per cent in the lower part of the fuel bed and as the gases issue from the top they contain as much as 26 per cent CO, depending on the thickness of the fuel bed. The composition of issuing gases seems to be independent of the air supply through the bed, which only influences the rate of combustion. The air for complete combustion of CO must be supplied as secondary air. The secondary air should be admitted at the fire doors just above the fuel bed. All fire doors have dampers for the purpose of adjusting the amount of secondary air admitted. Most boiler fronts are in such condition that there is little cause to worry about not enough secondary air.

*Paper prepared for thirty-second annual meeting Michigan Gas Association, September 10 and 11, 1924, Detroit.

### Air Leakage and Thickness of Fuel Bed

It takes time to burn CO and if there is more CO evolved than has time to burn before it strikes the boiler shell it will be cooled below ignition temperature and thus pass up the stack unburned. It was noted that the amount of CO evolved is controlled by the thickness of the fire. The thickness of the fire, with given grate area, is controlled by the load on the boiler, which determines the amount of fuel that must be burned. Roughly, with a given draft, there is a minimum depth of combustion chamber for good efficiency.

What the thickness of fuel bed should be for best efficiency must be determined by experimenting. First, by finding the minimum range necessary to move dampers for gaining desired control of boilers. Then changing the depth of fire at intervals of about two hours taking samples of the gases at frequent intervals and making CO and $CO_2$ determinations, the maximum at which the least CO is obtained is the most efficient depth of fire.

### Grate Surface Area

For standard boilers the grate area has been determined arbitrarily in proportion to heating surface for using coal, if boilers are working near their rated capacity it is often difficult and sometimes impossible to carry the load when firing breeze or coke. This may be overcome by moving bridge wall back and increasing grate area. The grate surface should be increased so that at maximum load not more than ten pounds of fixed carbon is burned per square foot of grate surface.

It is much more efficient to obtain increased capacity by increasing grate area than by employing forced draft, first, because by applying forced draft the volume of gases and per cent of CO issuing from the fire will be increased in such proportion that they will be required to move so fast that there will not be time for complete combustion before they are chilled below ignition temperature. Secondly, with forced draft there is danger of getting a positive pressure over fire, with the result that there will be insufficient secondary air.

### Use of Steam in Fire Box

The temperature of the fuel bed is determined by the rate of combustion and if it becomes high enough to cause clinkering this may be eliminated by passing a little steam under grates. Water vapor passed through the fuel bed, if temperature is quite low, say 1200 deg. F., or below, will result in $CO_2$ and $H_2$, and if high, say 1800 deg. F., will result in CO and H. Breaking up steam requires more heat than is produced by the formation of CO, with the result of lowering the temperature of fuel bed below clinkering of the ash. There is no loss, as the $H_2$ liberated will supply the amount of heat in combustion chamber that was lost in fuel bed. Another way of reducing clinkering is to increase grate area as mentioned above, and thereby lower rate of combustion per unit area of grate surface.

By grate efficiency is meant the ratio of the amount of combustible burned divided by combustible in fuel. With herring bone grates, with one-half inch air space and one-half inch bars not more than 6 per cent of combustible should be left in the ash when burning breeze. If more combustible is found in the ash it is due to inefficient firing.

### The Draft

If air leaks through the wall of the furnace it must be heated to the temperature of the gas, and this requires heat. It also lowers the temperature of the furnace gases and increases their volume, so that they move faster through the tubes, thus increasing the resistance for the waste flue gases and lowering draft through fire, also very much less heat will be absorbed by the boiler as the rate of absorption is proportional to the difference of temperature of water and gases. A leakage of 5 per cent air will result in about 1 per cent loss in fuel. A very good way to tell whether the setting is tight is to make a square wood frame of two inches square by two feet long stock, cover one side with a sheet of paper, with one-inch round hole in center, cover other side with a strip of felt two inches wide. Hold this up tight against the boiler wall, paper out, then hold a lighted candle in front of hole and watch flame be drawn in. This method of determining leaks will usually surprise the one making the test, as leakage through setting is usually greater than was expected.

Draft should be regulated mostly by means of stack dampers, but on very light load you get better efficiencies by closing the ash pan doors in addition to closing damper. If dampers are nearly closed with ash pan doors open there is apt to be insufficient secondary air, with the result of CO in the stack gases. Carbon when burned to $CO_2$ gives 14,657 B.t.u.'s per pound; when burned to CO it gives off only 4,383 B.t.u.'s per pound.

You can't afford to allow CO to pass out the flues.

### Internal Inspection

It is necessary to have boilers clean, free from scale and soot, stack losses soon mount high with slight accumulation of either. Boilers should be inspected often.

### Waste of Steam

Having done all to produce high evaporation per pound of combustible fired, the next important step is to use steam efficiently; for if steam is wasted, it does not matter how efficiently it is generated, boiler fuel is being wasted. To save steam is to save boiler fuel. Unless one knows where the steam is going and how much is being used, he cannot determine whether it is wasted or not. There is little question

(Continued on page 1090)

# The Maintenance of Gas Appliances

## British Gas Industry is Paying Much Attention to this Important Subject

*C. H. S. Tupholme*

COMPETITION in Britain between the gas and electricity corporations promises this year to be keener than ever. The gas industry is waking up to the fact that electricity is making not inconsiderable inroads into the domestic field of gas, and it also recognizes that where once electricity has gained a foothold by the introduction of a wiring system for lighting or any other purpose, the ultimate complete displacement of gas in that particular household is rendered very much more simple.

It is gradually becoming the general belief among gas engineers and distribution superintendents that a powerful weapon in the fight against electricity lies in the maintenance by the gas corporation of domestic gas fittings. As one well-known engineer has put it, the field of the gas engineer's work used to be considered as limited to gas manufacture. This point of view is obsolete. His real duty is very clearly not that of manufacture, but also that of application. The view is taken that what is required is a staff of skilled men to inspect domestic gas appliances in the homes of consumers so as to make certain that every detail is in good condition and that appliances are operating satisfactorily. This engineer holds that the main function of a gas corporation is to give efficient service to its customers. As he says, it is well to remember that "A satisfied customer is our best advertisement." The cost of such a scheme is very small when we consider the advantages gained by the consumer. The flat rate of charging commends itself more to most engineers than the method of charging each consumer separately for service. This engineer sums up his opinion in the words that the importance of maintenance cannot be over-emphasized and that it is one of the keynotes of the future progress of the gas industry.

### Importance of Appliance Maintenance

Hitherto the industry has largely adopted the complacent attitude of relegating the vital service of appliance maintenance to private traders, plumbers and self-styled gas fitters. This folly, emphasizes another engineer, has been tried long enough, and gives no satisfaction to the community, the disappointed tradesmen or to the gas corporations. It is, in fact, a clumsy method of robbing all to enrich none. The supervision and maintenance of domestic gas fittings, he holds, is essentially the work of the undertaking.

Another well-known engineer holds that every gas corporation has a distinct duty to its customers, especially in regard to appliances which are on hire. As a general rule, very little attention is given by users to cooking and heating stoves and other fittings, and these are expected to render efficient service year after year. No one can fail to notice the continuance in use of dirty and inefficient fires, broken and misplaced radiants. This engineer maintains that the only means of insuring satisfaction lies in periodical maintenance, without charge, except where lighting fittings are concerned, where the charge should be confined solely to that of the materials used. The financial aspect has, of course, to be considered, and it may be asked where the money required to carry out such a proposal is to be obtained. The obvious reply is that unless the industry gives this service on the very best terms to the consumer, progress will be stultified, and the securing of that very large share of domestic expenditure, which all are optimistic enough to expect, will be considerably deferred.

### Practical Results of Plan

It will perhaps be of interest to give some details of the experience of those who have already introduced this scheme.

In the first case, that of a large industrial town, the engineer believes in cleaning and adjusting burners, and where these are worn out he offers to fit one on approval for a week, then it is left to the consumer to decide. This has invariably been found to lead to further orders. At one period this concern made a small charge per burner cleaned. This proved so unpopular that it was dropped and now all large fittings are examined, cleaned and adjusted free of charge, only the material used being charged for.

In another large seaside town a universal service has been installed to embrace the inspection and control of all gas consuming apparatus.

### Monthly Maintenance Plan

In the case of a large industrial city and seaport the engineer believes such a system of maintenance to be absolutely essential. He has there two schemes in operation for shopkeepers and industrial plants which provide for a weekly inspection to clean fittings and supply material at cost price. The other scheme is for households and institutions where a monthly inspection on the same lines is carried out. No charge is made for labor, but renewals are charged at ordinary retail prices. Both these schemes are operating very well and are developing rapidly.

(Continued on page 1088)

INDUSTRIAL GAS LESSONS

IF IT'S DONE WITH HEAT — YOU CAN DO IT BETTER WITH GAS

# Lesson No. 41

## Expansion Effect of Heat (continued)

### Water Vapor in the Air

The rules, which have been described and exemplified above, pertain to the volume change that takes place in an individual gas, unmixed with other gases, which will change their status during the change in pressure or temperature. It is evident that if the gas or the mixture of gases contained water vapor, which condensed during the volume change, the results would be entirely different than if the water vapor were absent.

In metering coal gas or water gas or any other central station gas, especially when the wet meter is employed, there will always be a certain amount of water vapor present in the gas. This water vapor exerts a pressure which is measured in determining the pressure under which the gas is metered. In other words, a wet gas is being measured, and under certain conditions it is necessary to know the volume of the dry gas as well as of the wet gas. The amount of moisture that the gas can contain will depend, of course, on the temperature. Hence the percentage of water vapor in the wet gas is variable, but it will always be the same, or rather remain constant at a given temperature.

### The Tension of Air Saturated with Water Vapor

Hence in measuring the volumes of coal gas and the like, consideration must be taken of the water vapor that the gas contains. The table which follows gives the pressures that are exerted by the water vapor in the gas. Actually the values are given for air saturated with water vapor, under the condition that the gas holds as much of the water vapor as it can at the temperature.

| ° F. | Vapor tension in inches of mercury |
|---|---|
| 32 | 0.181 |
| 33 | 0.188 |
| 34 | 0.197 |
| 35 | 0.204 |
| 36 | 0.213 |
| 37 | 0.220 |
| 38 | 0.228 |
| 39 | 0.240 |
| 40 | 0.248 |
| 41 | 0.256 |
| 42 | 0.268 |
| 43 | 0.275 |
| 44 | 0.287 |
| 45 | 0.299 |
| 46 | 0.311 |
| 47 | 0.323 |
| 48 | 0.334 |
| 49 | 0.346 |
| 50 | 0.362 |
| 51 | 0.374 |
| 52 | 0.389 |
| 53 | 0.402 |
| 54 | 0.418 |
| 55 | 0.428 |
| 56 | 0.449 |
| 57 | 0.465 |
| 58 | 0.480 |
| 59 | 0.504 |
| 60 | 0.518 |
| 61 | 0.535 |
| 62 | 0.555 |
| 63 | 0.575 |
| 64 | 0.595 |
| 65 | 0.623 |
| 66 | 0.638 |
| 67 | 0.662 |
| 68 | 0.685 |
| 69 | 0.709 |
| 70 | 0.732 |
| 71 | 0.755 |
| 72 | 0.784 |
| 73 | 0.806 |
| 74 | 0.838 |
| 75 | 0.870 |
| 76 | 0.895 |
| 77 | 0.925 |
| 78 | 0.962 |
| 79 | 0.998 |
| 80 | 1.022 |
| 81 | 1.061 |
| 82 | 1.098 |
| 83 | 1.122 |

| | | | |
|---|---|---|---|
| 84 | 1.162 | 105 | 2.241 |
| 85 | 1.210 | 106 | 2.292 |
| 86 | 1.242 | 108 | 0.428 |
| 87 | 1.275 | 110 | 2.571 |
| 88 | 1.308 | 115 | 2.994 |
| 89 | 1.342 | 120 | 3.444 |
| 90 | 1.373 | 130 | 4.523 |
| 94 | 1.591 | 140 | 5.878 |
| 95 | 1.659 | 150 | 7.566 |
| 96 | 1.691 | 160 | 9.649 |
| 98 | 1.797 | 170 | 12.20 |
| 100 | 1.908 | 180 | 15.29 |
| 102 | 2.205 | 190 | 19.01 |
| 104 | 2.160 | 200 | 23.46 |

## THE MAINTENANCE OF GAS APPLIANCES

(Continued from page 1086)

### Maintenance of Appliances Important for Various Reasons

In one of the leading provincial towns the engineer places maintenance a very long way ahead in the weapons to fight electrical competition. He holds that such maintenance, as regards labor, should be entirely free, and that a staff of skilled fitters should be sent out by the gas concern to attend without charge to all defects on a consumer's premises. This engineer has tried schemes by which the consumer pays a fixed amount per annum to cover the cost, but these schemes have been comparative failures, because the majority of the customers would not agree to pay a fixed sum for a service they considered they could carry out better themselves. He believes that in the long run free maintenance will prove to be a paying proposition because it will lead to an extended sale of gas fittings and an increased use of gas.

The engineer of another large industrial city is convinced that an efficient system of maintenance is the only means whereby gas corporations can hope to increase their industrial load or even retain their existing load against the keen competition of electricity. He would base the charge for such a service on the cost of materials only, labor being entirely free.

A city in Scotland has had over twelve months' experience in maintaining the appliances of 9,000 consumers, covering 51 varieties of domestic fittings. The results have been highly gratifying and complaints have almost entirely disappeared from that particular area. The maintenance force takes the opportunity to educate consumers where necessary. The engineer here says he considers maintenance one of the best means of meeting the electrical competition.

### The Complaints of Customers

Many engineers can recall abundant instances where, on investigating a complaint, the defect was entirely due to the lack of proper maintenance. After all, the appliances sold or hired out to a consumer are only a means to an end, and such a sale or a hire is only the first step. Naturally, increased consumption depends largely upon the state in which domestic gas appliances are kept; if they are bad, the consumer will, in many cases, look around for a substitute, and the sale of gas drops. Again, it is obviously easier to obtain more business from a consumer whose appliances are kept in good order, and this alone should be sufficient inducement to install a system of maintenance. This, at any rate, is the growing feeling among British gas engineers, and there is no doubt that "maintenance" will be the hot topic wherever gas engineers in this country are gathered together.

## BANDAGE MAKING AIDED BY MANUFACTURED GAS

A recent application of manufactured gas to industry is in the making of webbing, bandages and similar articles for surgical use, where uniform quality is of vital importance.

Steam is needed to shrink and size the fabrics, and has heretofore been applied under pressure through a system of perforated pipes, across which the rolls of fabric were drawn. Metal hoods over these steam pipes failed to catch all the escaping steam, to the detriment of finished material and the discomfort of workmen in the room. Fluctuations in steam pressure resulted in uneven treatment of the fabric being steamed.

By the application of gas heat, an entirely different technique has been evolved. A closed metal box half-filled with water is set over a gas burner, which boils the water, filling the upper half of the box with steam. The rolls of surgical webbing are fed through slots in the top of the box, entering at one end and coming out at the other. By this means no steam escapes, the amount of fuel used is materially decreased, and the material is assured a more even steam-treatment than has hitherto been possible.

# As The Journal Views It

## THE 1924 CONVENTION AND THE WORK FOR THE NEW YEAR

The sixth annual convention of the American Gas Association has now passed into history. The great gathering of gas men from all over the United States and Canada, who attended the meetings of the Convention, are now returning, or have returned home. By the time this issue of the American Gas Journal reaches them they will have once more settled down to the customary routine of business.

The Convention was a great success. The attendance was large. The interest of the men who attended the sessions, and who visited the exhibition booths on the Steel Pier, was attracted and held in many ways. There was much to learn, much to see; there was plenty of opportunity to meet again with old friends and acquaintances to talk over the work of the year and the plans for the future. As is characteristic of all gas meetings, the serious side of the Convention was well interspersed with entertainment features, which were enjoyed by all.

All in all, it was a splendid meeting; a most representative meeting of men and women interested in gas!

The program of the meetings was very interesting and afforded the gas men opportunities to tell of their attainments during the year, and also to suggest plans for the coming year. In every section of the Association, considerable progress was reported and many plans and projects were outlined for the work of the coming year.

The gas men aimed high in this Convention. The goals which they have set for themselves for the past year are pretty difficult of attainment, but they clearly show that the gas industry is fully awakened to its possibilities to develop and become the premier fuel manufacturing and merchandising industry in the country.

Much attention was given to industrial gas. The gas industry in the coming year plans to develop, as much as it can, the industrial gas field. It plans to enter new fields in which this fuel has not been used, and also to enlarge the old industrial fields which have now become well developed as gas consumers. Nothing will be left undone to attain that end.

Customer ownership and its relation to finance, as well as the public relations side of the gas industry, will be given increased attention during the coming year. Those gas companies that have gone into this project have succeeded so well that it does not appear to be impossible for any gas company to attain good results from ownership campaigns. The gas industry is well aware of the advantages of customer ownership and understands fully that it will eventually become the main bulwark of defense against political depredations.

Another important matter that was discussed at the Convention and in which considerable work will be done in the coming year, is the increase of gas sales. This refers to sales, not only in the industrial, but in the domestic field as well.

The American Gas Association has been issuing each month bulletins on sales service, indicating to the gas company managers and merchandise men how they can best increase their sales. There is plenty of opportunity for increasing the domestic load, and the gas industry during the coming year will give this phase of the business careful attention.

Advertising also came in for discussion and the indications now are that eventually there will be established a National Advertising Campaign for the entire gas industry. This campaign will tie up directly with the work that is being done to increase gas sales.

One of the most important matters that faced the Convention was the education of employees, not only industrial gas engineers and salesmen, but employees in general. Considerable attention is being given to this matter. The plan for the coming year is to concentrate more and more on educational

work. There is no question but that one of the most significant problems of the industry today is to educate its employees so that they can do their work properly, and so they may know how to conduct themselves when they come in contact with gas customers.

An important development which has taken concrete form and which will be pushed further during the coming year is the matter of testing of gas appliances in the central laboratory. This will have a far-reaching effect in aiding the appliance manufacturers and investigators to develop and invent important appliances and new equipment, so that gas may be provided with the means to enter all fields of industrial enterprise. The question of statistics will also attract considerable attention in the coming year. The gas industry is in a position now where it requires more and more statistics concerning its manufacture and other matters pertaining to it. A collection of valuable statistics would help every branch of the gas industry, and this line of work is to be heartily commended.

Along the technical lines during the coming year there will be watched with increased interest the use of bituminous coal in the manufacture of water gas, the back-run gas process, the use of oxygen in gas manufacture and other important developments.

These are the plans of the gas industry for the coming year. They are all well worth striving for and it is unquestionable that gas men will make real effort in all these phases of the industry so that when the Seventh Annual Convention is held next year there will be much to report in the way of progress.

To all gas men in their work to improve their industry and themselves, The American Gas Journal wishes godspeed.

## LOCATING AND REDUCING EXCESSIVE USE OF BOILER FUEL

(Continued from page 1085)

but what high boiler fuel is caused as much by waste and inefficient use of steam as by inefficiencies of boiler plant equipment or firemen. In order to reduce steam consumption a complete steam survey of the plant is necessary to determine where savings can be made. Steam consumption of the various apparatus can be determined by the process of elimination, and knowing what the steam consumption should be, one can locate wastes.

It probably would not be amiss to be reminded of the importance of proper asbestos covering on all steam lines. That the safety valve should be permitted to blow off only once in twenty-four hours and then at regular periods and at a definite time each day, but not for an excessive length of time.

### Increase of Gas Sales and Boiler Fuel Costs

In conclusion, there is one other way to bring down costs of boiler fuel per thousand, and that is to increase gas sales. Or in plants where the carbonizing equipment is not used to capacity, one way to reduce cost of steam generation would be to develop coke sales to the point where coke could be disposed of just as it comes from the retorts and not accumulate breeze for boiler fuel. If the coke could be made to pay for coal carbonized, using gas for boiler fuel it would reduce cost of steam generation to minimum and also help prove to the world that we believe what we preach, "If it is done with heat it can be done best with gas."

## PUBLIC OWNERSHIP MEANS POLITICAL DIVIDENDS, SAYS INSURANCE HEAD

Government ownership of industry is a "substitution of government deficits for private profits, and the first and last step in the socialist seduction of democracy," declares Henry Swift Ives, secretary of the Casualty Information Clearing House.

"It pretends to take away from those who have for the benefit of those who have not," says Mr. Ives, "but in reality it takes away from all to the injury of all. It is an attempt to subsidize mediocrity by penalizing genius, but actually the only effect of such a subsidy is to make mediocrity even more mediocre. It represses the reproductive processes of capital, and then tries to revive them by a tax gland operation.

"Government ownership is destructive of wealth growth and productive of debt growth. It makes politics instead of business the national dividend producer. It promotes waste and demotes saving. And its whole tendency leads directly to the ultimate absorption by the state of all private property rights."

Political government, Mr. Ives says, is not adapted to industrial government, and industrial government is not suited for political government. If American business were operated with the same degree of lassitude and incompetence as are our government affairs generally, it would go into bankruptcy before the taking of another inventory, he declares.

The interdependence of business and industry is so complete that if public utilities were to be socialized, the farm, the corner grocery, the shoe factory and the flour and steel mills could not long remain as individualistic enterprises.

# Catechism of Central Station Gas Engineering in the United States

## Installment No. 41.

(Continued from week before last)

Therefore, $8{,}000 = 1{,}350 \sqrt{\frac{0.225d^5}{233.2}}$ and reducing $160 = 27 \sqrt{\frac{0.225d^5}{233.2}}$. Squaring this we have $25{,}600 = 729 \frac{0.225d^5}{233.2}$ from which we obtain $d^5 = 35{,}402$ and $d = 8+$ in.

For the fourth section,

$Q = 5{,}000$
$d = ?$
$p = 0.225$
$s = 0.53$
$l = 440$

Therefore $5{,}000 = 1{,}350 \sqrt{\frac{0.225d^5}{233.2}}$ and reducing $100 = 27 \sqrt{\frac{0.225d^5}{233.2}}$. Squaring this we have $10{,}000 = 729 \frac{0.225d^5}{233.2}$ from which we obtain $d^5 = 14{,}219$ and $d = 6+$ in.

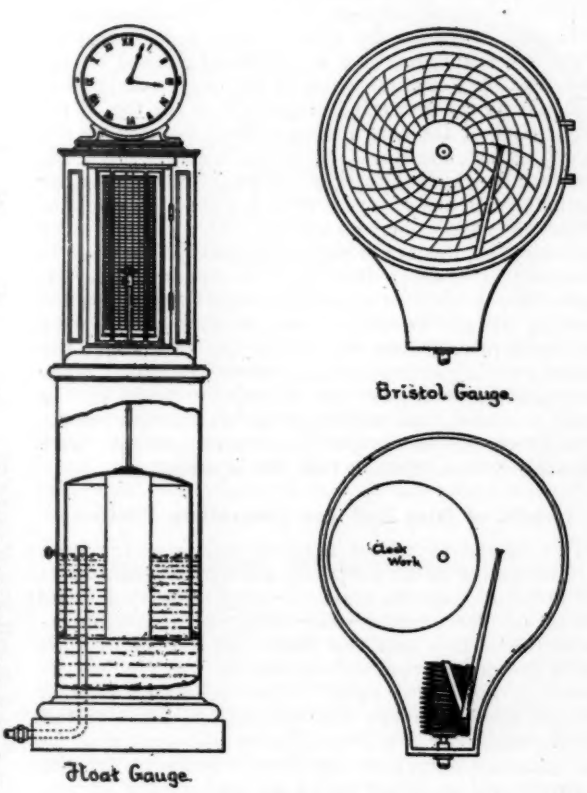
This shows that if it is absolutely necessary to keep the pressure from dropping more than 0.125 in. in each quarter mile, the first section would have to have a diameter larger than 10 in. and the third section a diameter larger than 8 in. In every case the pipe would be made of the standard diameter next above the actual diameter worked out as being necessary. The main would, therefore, be 12 in. for the first quarter mile, 10 in. for the next half mile and 8 in. for the last quarter. If, however, it makes little difference whether or not the drop is perfectly uniform, so long as the total drop allowed on the full length is not exceeded and the variation from uniformity is not great, the first half mile could be made 10 in. and the second half mile 8 in.

In practice the results which have been obtained above by calculation can be obtained much more easily and quickly by the use of the Gas-Flow Computer, referred to in the answer to question No. 219.

### Recording Pressure Gauge for Taking Street Main Pressures

222. Give a description, illustrated with sketches, of some form of recording pressure gauge used for taking street main pressures.

Ans. The form of recording pressure gauge that it is desirable to use for taking street main pressures depends somewhat upon whether these pressures are to be taken at any one location continuously, or for a day or two only. Where pressures are to be taken continuously, as at the gas works or the gas office, it is best to use a gauge which measures the pressure by the height to which a small bell sealed in water is raised by the gas admitted under it, since such gauges are the least subject to get out of order and give inaccurate records. Where pressures are to be taken only for a day or two a year, it is advisable, for the sake of its greater portability, to use a gauge based on the aneroid barometer principle, even though it is necessary to exercise greater care in using it.




**Recording Pressure Gauges**

A gauge of the first class mentioned, which may be called a "Float Gauge," is shown, partly in elevation and partly in section, on the left half of the

accompanying cut. Outwardly it consists of a tinned iron cylindrical case containing the bell and the sealing water, and surmounted by a half cylinder, also of tinned iron, the front of which is closed by a glazed door in the shape of half of a hexagonal prism, which contains the recording apparatus. At the top is a clock by which the recording mechanism is driven.

### How the Gauge Works

The bell, by the motion of which the pressure is measured, is made of tinned iron, and is provided with a cylindrical float, made concentric with the bell, with such an area that when submerged in water to the full depth of the bell, the weight of the water that it displaces is just equal to that of the bell and its appurtenances, so that when the bell is at the lowest point to which it can sink, it is just afloat when the pressure inside of it is equal to that of the atmosphere, and therefore is ready to rise as soon as the interior pressure exceeds that of the atmosphere. This bell is guided by wheels fastened around its lower edge and working on guides fastened to the case, and by a rod fastened to the center of the top and passing up through a small hole in the top of the ·wer part of the case into the space containing the recording mechanism. Gas from the street main, the pressure in which is to be recorded, is brought under the bell by means of a pipe entering through the base of the case and rising above the water line. A plug with a milled head is placed in the side of the case to drain off any water that may be run in above the water line and there is an outlet at the bottom for running off all the water. An opening, closed with a plug, is provided on the side of the case above the water line for putting in water when necessary. The stop-cock on the gas pipe is usually made with a small side outlet so that when the gas is shut off the interior of the bell is put into communication with the atmosphere through this side opening.

### Height of Rise Bell and Controlling Factors

The height to which the bell will rise for each 1/10 in. gauge pressure possessed by the gas admitted under it, depends upon its weight, its height and the area of the annular space between the circumference of the bell and the float. It is evident that when the total pressure exerted by the gas on the crown of the bell is equal to the weight of the bell and its appurtenances the bell will rise to its full height, since the whole weight will be supported by the gas, and therefore the float, having no weight to carry, will be forced up by the water until its bottom is on the level of the surface of the latter. The total pressure is eual to the gauge pressure of the gas multiplied by the area of the portion of the crown on which the pressure is exerted, and the weight in pounds that will be supported by this pressure is equal to the gauge pressure, in inches of water, multiplied by the area, in square inches. of the portion of the crown on which the pressure is exerted multiplied by 0.036, the weight, in pounds. of a cubic inch of water. Conversely the pressure in inches required to fully raise a bell, the weight and effective area of which is known, is equal to the weight divided by the product of the area and 0.036. In any given case, therefore, knowing the dimensions of the bell and of the float and the total weight, the pressure required to raise the bell to its full height can be calculated, and by dividing the height by the number of tenths of an inch in the pressure so determined, the amount of rise for each 1/10 inch pressure is obtained. Or, since this rise must be just sufficient to reduce the volume of water displaced by the float by an amount the weight of which is just equal to the total pressure exerted on the top of the bell by a pressure of 1"10 in. of water, knowing the diameter of the float the rise can be calculated directly by dividing the product of the area, in square inches, of the annular space of the bell and 0.0036 by the product of the area, in square inches, of the float and 0.036, or, what is the same thing, as can be seen by cancelling, by dividing the area, in square inches, of the annular space in the bell by the area of the float multiplied by 10.

### Recording Mechanism

The recording mechanism consists of a cylindrical drum supported on a central pivot at the bottom and connected by a central rod at the top to a shaft coming down from the clock. This connection is made in such a way that it can be readily broken and the drum removed. The shaft is so geared to the clockwork that it makes one complete revolution in twenty-four hours, carrying the drum with it when the connection is made. A sheet of paper, ruled with vertical lines to show the time and horizontal lines for the pressure, is wrapped around this drum and fastened so as to be carried around with it as it revolves. A pencil mounted on top of the rod carried by the bell is pressed by a light spring against the paper and makes a continuous line recording the pressure throughout the twenty-four hours. The vertical ruling marking the time is made by dividing the space equal in length to the circumference of the drum into twenty-four equal parts, so that in each hour one of these spaces passes under the pencil point. The proper distance between the horizontal lines marking the pressures is calculated in the manner explained above and the paper ruled accordingly. Both the vertical and horizontal lines are suitably marked to enable the pressure and time corresponding to any point on the sheet to be read off at a glance.

### Using the Gauge

In starting a record the paper must be so placed on the drum, that when the bell is open to atmospheric pressure the pencil point touches the line of zero pressure at the point corresponding to the time at which the start is made.

The Bristol gauge, one of the second class, is illustrated on the right half of the cut. The lower figure shows the pressure indicating mechanism and the upper figure shows a front view of the gauge with the card in place, so that the manner in which this card is ruled can be seen.

Both the indicating and the recording mechanism are contained in one cast iron case, which is a shallow box of an inverted pear-shaped section. The elongated part at the bottom is covered over with a solid cover, while the upper part is provided with a circular, glazed door.

### The Pressure Indicating Mechanism

The pressure indicating mechanism, contained in the elongated portion of the case, consists of a number of rings made of thin corrugated brass fastened together so as to form a gas-tight vessel similar to an accordion in shape. The corrugations on each ring are arranged in circles concentric with its edges. The metal being very thin, the effect of even a very slight increase in the pressure inside the vessel is to flatten the corrugations, thus increasing the width of the rings and producing an elongation of the vessel. When one side is prevented from lengthening by means of a flexible strip placed against it and fastened to the top and bottom rings by turned-over ends, the effect of the pressure is to cause the vessel to become curved, the top plate being tilted and its center thrown off the vertical line to the side on which the strip is fastened. The greater the pressure the greater the curvature and the greater the tilting of the top plate and the displacement of its center from the vertical line. By means of this tilting and displacement, the point of a bent arm attached to the top plate of the vessel is moved, along the arc of a circle, farther away from the vertical line as the pressure increases.

The record of pressures is obtained by providing the point of this arm with means of making a continuous line on a circular card fastened to a plate, which is caused by clockwork to make one revolution in twenty-four hours. The pressure lines are concentric circles placed the proper distance apart, while the lines marking the time are arcs of circles corresponding to the arc along which the marking point travels as the pressure rises and falls. Both sets of lines are so marked as to enable the pressure and time corresponding to any point on the card to be noted at a glance.

Owing to the lightness of its parts a gauge of this kind cannot stand rough usage and must be very carefully handled to prevent its getting out of order and to keep it accurate.

### Locating an Obstruction in Distribution System

223. How would you proceed to locate an obstruction in the distribution system of your town, the presence of which is indicated by a general complaint of poor supply in a district which is fed from several points and in which the pipes are large enough to properly supply the demand if no obstruction exists?

Ans. It is assumed, as a matter of course, that all the drips in the various mains supplying the district have been gone over, as soon as attention is called to the trouble, to make certain that it does not arise from a flooded drip due to an unusual cause that has developed since the time of the last periodical examination, and that they have been found all right.

This possible cause having been eliminated from the problem, the next step is to determine which of the several feed mains, by which the district is supplied, is the one that is obstructed. To do this it is necessary to observe the pressures, at the time of heavy consumption in the district, at a series of points along each of the mains, using for the purpose lamp post pipes, or special pressure pipes, if either exist, or else the pumping pipes on drips that are suitably located, or as a last resort the consumers' services. If recording gauges are available in sufficient number, they can be used and will give a means of comparing the pressures at the various points during the whole time of heavy consumption; but if they are not available the desired information can be obtained by the use of ordinary syphon gauges in the following manner: Observation must be taken at, at least, two consecutive points simultaneously. The gauge farthest along in the direction in which the work is being done, which should be that in which the gas is expected to flow, is then left in place while the other gauges are moved to the points next in succession and another set of simultaneous observations taken, this process being repeated until the whole length of the pipe has been covered.

When the pressures have to be taken from the services with syphon gauges all the requisite preparatory work should be done in the day-time, so that there will be nothing to do in the evening except to attach the gauges and take the observations. The amount of gas being used through each service, at the time the pressure is observed, should be noted, to determine whether any allowance should be made for a reduction in pressure on this account. Any other causes, such as differences in elevation, that would normally affect the pressure, must also be taken into consideration and an allowance made for their effect.

### Location of Points Where Pressure Is Taken

The location of the points at which the pressures are to be taken will depend largely upon the special conditions existing in any system, but, in the absence of any reason to the contrary, they should be selected so that the pressures should, under normal conditions, show as nearly as possible equal drops between consecutive points.

If no obstruction exists in the main being tested the pressure will show a gradual and uniform decrease at each point, and if the observed pressures decrease in this way the pipe is thus shown to be free from obstruction. An obstruction, by causing the flow of gas through the pipe to be below the normal amount, will cause the pressure to show practically no reduction up to the place at which the obstruction is located, with a sharp drop, equal to almost the whole loss, as soon as the obstruction is

passed. When these conditions are observed on one of the mains it is certain, not only that the obstruction that is being sought for is in this main, but also that it is located between the two points showing the large difference in pressure. The exact location can then be found by taking the pressures at various points between those determined as above, the points being taken closer and closer together until the drop in pressure is located between the two consecutive available points that are nearest to each other. When this has been done, the main must be uncovered at a point midway between those at which the pressures were last taken, a hole tapped in the pipe and the pressure taken to determine on which side of this hole the obstruction is to be sought. A stout wire can then be inserted, in the proper direction, to determine whether the obstruction is within striking distance, and if so, its exact location and nature. If it cannot be located in this way the main must be uncovered at another point, midway between the last point and that one of the points previously taken which shows the marked difference in pressure, a hole tapped, the pressure taken and the wire used, this being repeated until the exact location of the obstruction is found.

### Character of Method

The above method, which requires that the taking of pressures be done during the time of maximum consumption, that is, usually in the early evening, is the only one that can be employed when the day consumption is comparatively small. When the day consumption is relatively large, the line in which the obstruction exists can be determined in the daytime by bagging off the feed mains, one after another, at points as far removed from the center of the district as possible, noting, in each case, the pressure at some point in the district, both before and after the bag is put in. If a main is doing its share of the work of supplying the district, stopping it off will cause an appreciable reduction in the pressure, while if it is already obstructed the effect of a complete shutting off will not be marked. If, therefore, the pressure shows no decided change when one of the mains is bagged the obstruction is to be sought in that main, and its position can be located by bagging at several points in succession and noting in each case the drop in pressure on each side of the bag when gas is allowed to escape from the pipe through the bag hole, the bag being put first to one side of the hole and then to the other. As long as the obstruction has not been passed the flow of gas induced in this way will cause only a slight drop on the side towards the feed, and a larger one on the side towards the district. As soon as the pipe is bagged on the district side of the obstruction the drop in pressure will be almost the same on both sides and the obstruction must be looked for between the first hole at which this is observed and the last hole at which normal conditions were found to exist. This method of bagging the mains is especially useful where no services are taken off the feed mains for some distance before the affected district is reached.

The character of the steps to be taken to remove the obstruction will depend upon its nature. If it is an accumulation of water due to a sag in the main, all that is required is the regrading of the main, while if it is a solid obstruction that cannot be removed by the use of solvents, it may be necessary to cut the main before it can be cleared.

### Determination of Adequate Size of Mains

224. What should be done to determine each year whether the street mains in a gas company's district are sufficiently large to satisfactorily supply the demand for gas over the whole district?

Ans. The best and surest way in which to ascertain whether or not the street mains of any gas company are large enough to give a satisfactory supply of gas in all parts of its district is to take, and record, each year readings of the pressures existing at a sufficient number of points to thoroughly cover the district, these observations being taken during the hour of heaviest consumption on successive days in the early part of December. If the district is abnormal in not having the heaviest consumption in December, the pressures should be taken during the month in which the largest consumption does occur.

The pressures may be taken either by single readings of a U gauge moved from point to point, or by means of recording gauges provided in sufficient number to allow one to be set at each of the points to be covered by the observations of any one day. The use of recording gauges kept in action for several hours each day gives a means of determining absolutely the lowest pressure existing at any test spot during the hours of heaviest consumption, but it involves a fairly large outlay for gauges and quite a little labor in handling them, while with the U gauge the work can be done at comparatively small expense, provided there are lamp posts connected up to the mains in all parts of the district. If there are such posts, nor any special pipes arranged so as be easily accessible on the street, the pressures have to be taken by attaching the gauges to consumers' services at some point between the main and the meter, and it is necessary to use recording gauges.

When the U gauge is used it is essential that the observations made on any one day be taken only during a period when the rate of consumption is practically steady and at its maximum. The length of this period and the time of day at which it occurs can be determined by means of pressure records for the whole twenty-four hours, taken with recording gauges placed for a week at each one of several points carefully selected with a view to obtaining average results for the whole district. The period best suited for taking the observations with the U gauge will be the hour or half-hour during which these records show the lowest pressure, the longer period being taken if there is little variation in the pressure during that length of time, and the shorter one if the pressure does not remain steady during a longer time.

(Forty-second Installment Next Week)

## FUEL OF THE FUTURE

(Continued from page 1082)

### Potential and Real Heat Values

It is one thing to say that an engine has a certain horsepower and again an entirely different matter to state that it delivered a certain horsepower. One is potential and the other is real. The same relation holds good of gas. Of course, a natural gas of 1,000 B.t.u. per cubic foot has a higher fuel value than a blue water gas of 300 B.t.u. per cubic foot. But that is not what interests the engineer or the manufacturer. What he wants to know is how much useful work he can get out of this gas, and furthermore what the net heating effect is per dollar that he pays for his fuel.

This is the important question and it can only be solved by making a study of the thermal capacity, or rather the concentration of heat values in the products of combustion. It must be remembered that after all it is not the gas or the mixture of gas and air that actually performs the heating, but the gaseous combustion products that are obtained from burning the fuel and air mixture. And, furthermore, it is not true that every gaseous mixture will give the same thermal results with the same efficiency provided that sufficient air is present in every case to produce complete combustion. This is emphatically the reason why it is important to consider the matter of heat values in the combustion gases.

### The Details of the Comparison

A comparison has been made of the heat value of four different gases, namely, a natural gas, a coal gas, a blue water gas and a producer gas. The B.t.u. per cubic foot of these gases are as follows:

| | |
|---|---|
| Natural gas | 970 B.t.u. per cu. ft. |
| Coal gas | 630 B.t.u. per cu. ft. |
| Water gas | 301 B.t.u. per cu. ft. |
| Producer gas | 135 B.t.u. per cu. ft. |

The analyses of these various gases are given below, so that all the details of this comparison may be included:

| Constituents | Natural gas | Coal gas | Water gas | Producer gas |
|---|---|---|---|---|
| Carbon dioxide | 0.05 | 1.5 | 6.0 | 5.2 |
| Unsaturated hydrocarbons | 0.0 | 4.0 | 0.0 | 0.0 |
| Oxygen | 0.0 | 0.5 | 0.5 | 0.4 |
| Carbon monoxide | 2.0 | 6.0 | 38.0 | 22.9 |
| Hydrogen | 0.0 | 50.0 | 48.0 | 15.3 |
| Saturated hydrocarbons | 96.0 | 36.0 | 2.0 | 1.0 |
| Nitrogen | 2.0 | 2.0 | 5.5 | 55.2 |

### The Heat Producing Constituents in the Gases

From this tabulation it can be seen that the principal heat producing constituent in the natural gas are the saturated hydrocarbons, which are mainly methane and ethane. There is also considerable of these hydrocarbons present in the coal gas and together with the hydrogen they represent the principal heat yielding constituents in that gas. Water gas has both carbon monoxide and hydrogen as the main heat producing ingredients and producer the same two. The unsaturated hydrocarbons refer to ethylene and higher members of that series which may be present in the gas. They also possess heat value.

By methods which have been described in former articles in this series, it is possible to calculate first the number of cubic feet of air that will have to be mixed with the gas in order to give complete combustion of the combustible constituents. Then the weight of the combustion products may be found from the volume of air required for combustion and the combustible ingredients that enter into combination with the oxygen of the air. This will give the weight of combustion products per cubic foot of gas burnt. It is also easy to calculate the number of heat units per cubic foot of combustible mixtures, although this figure is not of equal importance to the heat units per cubic foot of combustion gases.

These various values for the gases, whose analyses have been given above, are contained in the following tabulation:

| | Natural gas | Coal gas | Water gas | Producer gas |
|---|---|---|---|---|
| B.t.u. per cu. ft. of gas. | 970 | 630 | 301 | 315 |
| Volume of air required to burn 1 cu. ft. gas. | 9.23 | 5.34 | 2.23 | 0.99 |
| Pounds carbon dioxide produced in the combustion | 0.1133 | 0.0595 | 0.0532 | 0.0336 |
| Pounds water produced in the combustion.. | 0.0914 | 0.0619 | 0.0247 | 0.0082 |
| Pounds nitrogen in the products of combustion | 0.5395 | 0.3128 | 0.1342 | 0.0984 |
| Weight of the products of combustion | 0.7442 | 0.4342 | 0.2121 | 0.1403 |
| B.t.u. per cu. ft. of combustible mixtures | 94.8 | 95.1 | 93.2 | 67.9 |

### Discussion of Figures in the Table

The first thing that strikes the attention in this table is that, with the exception of producer gas, the concentration of heat units in the gaseous mixtures, mixtures of gas with air, before combustion takes place, is practically the same in all gases. The slight difference that does occur is not of any account. The reason for this is, of course, that the gases, such as coal gas and natural gas, which contain a higher calorific power in their unmixed state, require more air to be mixed with them to secure complete combustion than the water gas, which has

less heat-producing constituents, and hence requires less air for combustion.

### Air Used for Combustion

The use of more air for combustion means, of course, a greater amount of combustion gases. Thus, in the case of natural gas, which requires 9.23 cubic feet of air for complete combustion, the weight of the products of combustion is 0.7442 pound per cubic foot of gas, while in the case of water gas, which only requires 2.23 cubic feet of air for complete combustion, the weight of the combustion gases is only 0.2121. In other words, there are more than three times as much combustion gases obtained when one cubic foot of natural gas is burnt than when one cubic foot of water gas is burnt.

It is understandable that the heat that is produced in the combustion of the gas is distributed throughout the combustion products, and if the heat developed were the same in toto in all gases, then the very fact that more gases of combustion were produced in one case than in another, as indicated above, would indicate at once which gas possessed the greater concentration of heat values. But this alone does not determine the heat concentration of the gases of combustion, as the different ingredients of the gaseous fuel burn to develop different amounts of heat per cubic foot or per pound of original gas and also per cubic foot or per pound of gases of combustion.

### What Heat Is Available for Work

It must constantly be borne in mind that the heat that is available for doing work is a relative factor. It is not sufficient to say that such and such a gas will give so many available heat units on combustion. It is necessary to define the temperature at which this work is going to be done. Thus it is understandable that more heat will be available from any one gas, being considered when the working temperature is low than when it is high. For a certain proportion of the heat that is developed in the combustion of the gas must be consumed in bringing up the temperature of the gases of combustion to the point required in the operation. Thus at the point where all the heat in the gas is used in heating up the products of combustion, there is obtained what is known as reaction or flame temperature. This is the highest temperature that can be obtained from the gas, assuming, of course, that no heat is lost by radiation and conduction.

A careful analysis is given in Bacon and Hamor's American Fuels, from which these figures are taken, of the amount of heat originally in the gaseous fuel that is available for use at different temperatures. The remainder of the heat is consumed in heating up the products of combustion to the temperature at which the operation takes place. Thus, at a temperature of 2000 degrees F., 43.8 per cent of the heat originally in the natural gas, possessing 970 B.t.u. per cubic foot, is available, as against 45.9 per cent of the heat in a 630 B.t.u. coal gas, 48.9 per cent of the heat in a 300 B.t.u. water gas and 34.5 per cent of the heat in a 135 B.t.u. producer gas. It is thus evident that the water gas is more efficient at this temperature than any of the other gases. Then, again, at 2,800 degrees F., 20.2 per cent of the original heat in the natural gas is available for doing work, against 23.1 per cent of the heat in the coal gas, 27.00 per cent of the heat in the water gas and 4.6 per cent of the heat in the producer gas.

### The Contributing Factors

It is, therefore, quite evident that the concentration of heat in the original gas and the concentration of heat in the gaseous mixture before combustion are not the determinant factors in the quality of the gas. The important consideration is the concentration of heat in the gaseous products of combustion. What this concentration will be will depend, as has been shown, to a certain extent, on the quantity of air that is required and used for complete combustion of the gas. The percentage of ingredients in the original gas is also of importance in determining what the heat value of the combustion gases will be, for the heats of combustion of the gaseous ingredients vary. However, this factor is of far greater significance in determining the total heat contained in the gases of combustion than the distribution of that heat in them.

### Heat Concentration and Flame Temperature

The concentration of the heat units in the products of combustion is also of considerable importance in determining the flame temperature of these gases. It is evident that the heat which is contained as chemical energy in the fuel and which is converted into heat energy during combustion is used up in raising the temperature of the combustion gases. Of course, a part of this heat is lost in radiation and conduction, which is a matter of furnace design, rather than a characteristic of the fuel. It therefore follows that the higher the concentration of heat units in a cubic foot of combustion gas the higher will the flame temperature of the gases be and the more work will it be able to perform.

Heat concentration in the combustion gases is, therefore, a primary factor in determining the efficiency of a gas for a certain purpose. Let it be assumed that two gases are being considered, one (A) for which the heat concentration per cubic foot of combustion gases has been found to be 96.2 B.t.u. and the other (B) which possesses a like characteristic of 106.5 B.t.u. per cubic foot. These gases are assumed to be used in a chamber from which the flue gases escape at a temperature of 2,300 degrees F. As the specific heats of the gases that constitute the products of combustion, derived from a commercial gas, are about the same, it may be assumed that at any particular temperature the amount of heat in the products of combustion would be, more or less, the same per unit volume. However, as has been in-

dicated in previous articles in this series, it is possible to calculate how much heat will be carried away at 2,300 degrees F. in the flue gases for each fuel gas mentioned above. This is found to be 63 B.t.u in the case of the gas (B) and 61.4 in the case of gas (A).

### Calculating Available Heat in Gas

Then the available amount of heat in the products of combustion, the amount of heat will do the work, is the difference between the original concentration of the heat units in the combustion gases and the heat that leaves the furnace in the flue gases. For it must be understood that inasmuch as the furnace temperature must be maintained at 2,300 degrees F, the flue gases cannot leave the furnace at a lower temperature and the heat that is contained in them at that temperature is lost as far as useful work is concerned, unless an attempt is made to recover this heat in one way or another.

Hence it is found that the useful heat in the case of the gas (A) is 96.2 less 61.4, or 35.8 B.t.u., and in the case of gas (B) 106.5, less 63, or 43.5 B.t.u. It is thus evident that the gas which has the higher concentration of heat units in the products of combustion, which means as well a higher flame temperature, will possess considerably more heat units that can be used for useful purposes. An interesting figure is obtained by dividing the available heat units by the total amount of heat per cubic foot combustion gases. In this case it will be seen that 41 per cent of the heat in the combustion gases are available for useful work in the furnace.

### Preheating the Air and Gas Before Combustion

This brings up the matter of preheating the air and gas before they are burnt in the furnace. The object of this practice is to utilize some of the heat that leaves the furnace in the form of flue gas. The value of preheating both gas and air is self understandable, but in this connection it must again be mentioned that the higher the B.t.u. of the original gas, generally speaking, the lower the temperature to which it can be heated with safety. Thus, in the case of a high B.t.u. gas, like natural gas, the temperature to which the gas could be heated by the flue gases is much less than in the case of producer gas, which has a much lower B.t.u. value. This forms an important consideration in the selection of a fuel for industrial purposes, as regeneration of heat in the flue gases is often the determinant factor in the economy of the process.

Flame temperature has also been mentioned as an important factor in determining the quality of a gas and its usefulness for industrial heating operations. The same reasoning may be employed in this case as in the matter of concentration of heat values in the gases of combustion. High flame temperature means the same as high concentration of heat values in the products of combustion. Flame temperature is important, for it affects not only the quantity, but the rate of heat transfer from the hot gases of combustion to the material that is being heated. Heat transfer takes place by conduction, convection and radiation. In each of these cases the greater the temperature difference between the hot and the cold body the greater the amount of heat will be transferred and the greater the rate at which this transmission of heat will take place. This is naturally of prime importance in the heating operation.

The transfer of a greater quantity of heat means better utilization of the heat in the combustion gases and the reduction of the time within which this takes place also connotes better furnace efficiency. It also means greater productivity of the apparatus and lower cost of manufacture.

### Flame Propagation

The final characteristic of a fuel which determines its quality is the rate of flame propagation, which means the rate at which the fuel will burn, the velocity at which the chemical energy in the fuel will be converted into heat energy. This is an important matter from various standpoints, for on it will depend the way in which the burner is designed, so as to obtain the correct mixture of gas and primary air.

As far as the efficiency of the fuel is concerned, it may be stated that the greater the rate of flame propagation the more efficient will the fuel be. For when all other things are equal, it is evident that the quicker the fuel will burn, the higher the temperature of combustion, as all the heat is available within a short period of time for raising the flame temperature of the combustion gases. In slow burning gas a part of the heat is absorbed by the gas that remains unburnt, and, furthermore, the loss of heat by radiation is greater, with the result that the flame temperature of the gas is less.

The rate of combustion is a very interesting factor in determining the quality of a gaseous fuel, for the expensive hydrocarbon ingredients of the gas, which are derived from the cracking of gas oil, or which may naturally be present in the gas, as in the case of natural gas, while they give a higher B.t.u. value to the original gas, possess the lowest rates of flame propagation and thus tend to reduce the flame temperature of the gas and furnace efficiency. Thus hydrogen is the gas which has the highest rate of flame propagation, which is from eight to nine times as great as that for carbon monoxide, although when the latter is mixed with hydrogen or water vapor, its rate of combustion is considerably greater, though still about one-fifth of that of hydrogen. Methane, which is found in such large quantities in natural gas, possesses a low rate of burning.

### Comparing the Different Gases on This Basis

Hence a high B.t.u. water gas, which has been produced by carburation with gas oil, will not have

nearly so high a rate of flame propagation as a water gas of only half the calorific value. This means a considerably reduced flame temperature in the case of the more expensive coal gas and a lower efficiency in the industrial furnace. Another important consideration in this respect is that the flame temperature of the water gas-air mixture is much greater than that of the coal gas mixture over a much wider range of gas and air mixtures. This makes the water gas a much more flexible gas to use.

In summing up, the three most important characteristics of a gaseous fuel are the concentration of the heat values in unit volume of the products of combustion, the flame temperature of the gas and the rate of heat propagation. As has been shown, all these factors are closely inter-related. They are the real criteria on which to base the quality of a gas, and not the B.t.u. that it may contain. The whole centers around a very simple point, namely, that it is not what the fuel contains in the way of heat values that determines the value of the gas, but the manner in which these heat values are released, are converted from chemical energy into heat energy, and rendered available for useful purpose, that determines the worth of the fuel. And when gaseous fuels are compared with each other on this basis, it is found that a 300 B.t.u. water gas is the most efficient of all.

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## WEST SHOWS MARKED IMPROVEMENT

(Continued from page 1083)

caused by the ordinary needs of the market. And these needs are not large enough to justify any wild hopes in the future of the market. There is no chance for a boom. But there is every hope for steady all around improvement.

Support is given to this view of the situation by the improvement of the agricultural situation, by the healthy condition of the national industry, by actual evidence found from a study of the business activity in leading retail centers, the money situation and the condition of certain key industries.

There can be no dispute today over the healthy change that has taken place in the agricultural sections of the nation. The northwest and middle west have shaken off their lethargy and money is circulating more freely in the rural communities. How long this condition will last only the future can tell. To judge from reports from wholesale distributors, the movement is still not strong enough to produce any increase in retail orders. But, even so, it must have helped to clear the shelves of the country stores, turning into cash merchandise that had been accumulated since last autumn. Orders for replacement must follow. It is, however, not certain that these orders will exceed in volume the usual quantities ordered around this time of the year. And it must be remembered that the market is not setting out for a boom, but merely is trying to return to normalcy.

### Business Bound to Improve

These orders, nevertheless, are large enough to bring a promise of business to a large part of the national industry, which has had a very trying summer. This business will be the more appreciated as all orders appear to be taken on prices that leave a healthy profit to the manufacturer. In fact, statistics show that industry has stood the crisis extremely well and is coming out of it with its earning power unimpaired. Allowing for a few exceptions, manufacturing cost and wholesale prices have continued upon levels favorable to the manufacturer and profits have shown no further decrease.

Speculation now is ripe as to the further development of the new buying movement. As stated before, it has taken its start in the agricultural West and is now working its way in the direction of the industrial centers. Larger sales by Western department stores, heavy railroad loadings, favorable reports from mail-order houses point to the widening radius of the new prosperity. The banks have had no difficulty in financing the crop movement and the reported increase in unfilled orders of the U. S. Steel Corporation shows that industry also is taking a more optimistic view of the situation.

### No Lack of Encouragement

There is, therefore, no lack of encouragement to those who are inclined to take an optimistic view of the situation. But there is still the danger that the present improvement will be of short duration only and will not be sufficiently strong to carry the market clear through the Christmas season into the New Year.

Taking everything into consideration, we are inclined to think that there will be a downward movement after the crest of the present wave has been reached. This decline, however, will be slight and of short duration. It may be so insignificant in some industries as to be hardly noticeable, and it will be counterbalanced in its effect upon the national market by a rise in such industrial fields which up until now have been kept outside the range of the economic recovery.

Any further downward movement, therefore, should not have any depressing effect upon enterprise. But its possibility should be sufficient caution to those who, encouraged by the favorable money situation, see the coming of a boom in the slightest ripple upon the sea of our prosperity. There is no chance for such an eventuality, and, still more, it is not wanted. But it will take all the good sense of the financial interests to check the bulls if by chance they should see their opportunity and get beyond control.

The situation is bound to remain full of exciting possibilities until after the election.

# *Merchandising Coal in the Small Plant

## Important Points Relative to Selling Coke

*J. K. Swanson*

Consumers Power Co., Saginaw, Mich.

STUDY your field carefully and determine just what size of coke seems to meet the popular demand. When you are able to hit this demand squarely on the head, your next step should be to build up a reputation for consistent grade and size. The experience which confronts you from time to time will be that heretofore very little, if any, attention has been given to the preparation and size of coke. In other words, just as it came from the retorts or ovens was about the way it was delivered. In fact, nobody took any interest in the coke pile except the young man who had charge of the weigh scales. Realize that smaller companies cannot go to the expense incident to the preparation of coke too extensively, for it makes the price prohibitive. However, insofar as it is possible for you to be consistent in the preparation and grade of your coke, you will find that this procedure is a decided step in the right direction.

### Sell Your Coke in the Hot Weather

You will find that a splendid clientele can be built up as coke users, if you go after the business in the summer months. This is one of the successful methods:

Have a competent person go through your ledgers and pick out your preferential customers with reference to credit. You will find that this list will represent about 80 per cent of the users of gas. Your next step is to secure the services of one of your own men, who will make a house to house canvass of your preferential list and sell them for immediate delivery their following fall and winter supply. One of the most successful experiences in this particular line and especially in the smaller communities was that of using the man as a salesman who actually made the deliveries the winter or winters previously. Of course, it is not always possible to get the qualifications of salesmanship in a man who is actually delivering coke. However, the townfolk generally know him and give him a ready entree and consider his approach as worthy of hearing. Pay him five cents per ton plus regular wages and he will produce orders.

### The Price

This adventure will be met with one serious obstacle, viz., price. The first thing your salesman will be asked is, "What is the price of coke going to be next winter?" His ready answer must be, "We will protect you on the price." Thus, if your price decreases, you will protect the customer on all summer deliveries up to October 1 and make no changes in price in case of any increase up to say, October 1. Of course, obviously, if the price increases, the purchaser is the direct beneficiary. This is the selling twist for summer delivery.

### Credit

Your next obstacle is the fact that the people have not the money to pay for their winter supply at that particular time. Right here is where your plan of summer delivery and preferential list will play its important part. Extend to them gladly the privilege of credit for the months of May, June, July, August, September and October. Do not ask them to sign any contract or agreement. Simply state that the price is guaranteed and all they need to do is pay for one ton on delivery and the balance at the rate of one ton per month. Experience has been that people usually take on the average of five to six tons. This, then, gives the consumers a very easy and satisfactory method of filling up their coke bins for the coming winter.

Furthermore, you have made a decided step in advance of your local soft coal dealer and outside coke competition. In other words, you are a step ahead of the other fellow. There is no argument that can offset a coal bin that is full of coke for the coming winter.

### Advertising

Of course, use the American Gas Association Advertising Bulletin for your suggestions in connection with pushing your coke sales, keeping always before the townspeople the quality, preparation and advantages of burning coke as compared with anthracite and bituminous coal. The value of this suggestion needs no amplification.

### Following Up Deliveries

Use a follow-up method after delivery, which will be conducive to a heap of good will. Procedure in this connection is as follows:

Have some individual drilled in the art of establishing good relations with the customer. Call on the customer and ask the privilege of inspecting the basement window to see if the coke was properly cleaned up around the outside and if they left the coke so placed in the basement that it is perfectly satisfactory to them. At the same time that he makes this call, he delivers a circular which shows the individual how to burn coke to the best advantage. Perhaps this party may sell the customer additional tonnage. This service usually prompts a favorable testimonial from your customer. We all know that it is difficult for any individual to repudiate his own testimonial.

These suggestions, if carried out, will materially assist you in solving your problems.

*From the report of the Coke Committee, delivered at the meeting of the Technical Section, A. G. A., Sixth Annual Convention, Atlantic City, October 15, 1924.

# Current Market Prices

## COALS (By Courtesy of Coal Age)

### A. Bituminous.

(Spot prices, F. O. B., mines, net tons).

| High Volatile, Eastern | Market | Price |
|---|---|---|
| Pool 54-64 (Gas Standard) | New York | $1.50 to $1.65 |
| Pittsburgh screened gas | Pittsburgh | 2.30 to 2.50 |
| Pittsburgh gas, mine run | Pittsburgh | 2.00 to 2.25 |
| Kanawha lump | Columbus | 2.00 to 2.25 |
| Kanawha mine run | Columbus | 1.30 to 1.55 |
| West Virginia lump | Cincinnati | 2.50 to 2.75 |
| W. Virginia gas mine run | Cincinnati | 1.40 to 1.65 |
| **Midwest** | | |
| Indiana 4th vein lump | Chicago | 3.00 to 3.25 |
| Indiana 4th vein mine run | Chicago | 2.25 to 2.50 |
| **South and Southwest** | | |
| Big Seam lump | Birmingham | 2.75 to 3.25 |
| Big Seam mine run | Birmingham | 1.50 to 1.75 |
| Southeast Kentucky lump | Louisville | 2.75 to 3.50 |
| Southeast Kentucky mine run | Louisville | 1.35 to 1.75 |

### B. Anthracite.

(Spot prices F. O. B. mines, gross tons),

| | Market | Freight rates | Independent | Company |
|---|---|---|---|---|
| Egg | New York | $2.34 | $9.25 to $9.75 | $8.75 to $9.25 |
| Egg | Philadelphia | 2.39 | 9.00 to 9.70 | 8.80 to 9.25 |
| Egg | Chicago (net tons) | 5.06 | 8.17 to 8.27 | 8.14 to 8.20 |

## COKE (By Courtesy of Iron Trade Review).

| | |
|---|---|
| Connellsville, furnace | $3.00 to $3.25 |
| Wise County, furnace | 3.75 to 4.00 |
| Alabama, furnace | 4.50 to 4.75 |
| Foundry, Newark, N. J., del. | 10.41 |
| Foundry, Chicago, ovens | 10.75 |
| Foundry, Boston, delivered | 11.50 |
| Foundry, St. Louis | 11.00 |
| Foundry, Granite City, Ill. | 9.00 |
| Foundry, Alabama | 5.00 to 5.25 |

## PETROLEUM (By Courtesy of Oil, Paint & Drug Reporter)

(Prices at wells, per bbl.)

**Pennsylvania—Ohio—West Virginia.**

| | |
|---|---|
| Cabell, West Virginia | 1.45 |
| Corning, Ohio | 1.65 |
| Lima | 1.58 |
| Pennsylvania | $2.75 to 2.85 |
| Wooster, Ohio | 1.40 |
| **Indiana—Illinois.** | |
| Illinois | 1.38 |
| Indiana | 1.39 |
| **Oklahoma—Kansas.** | |
| Healdton | .90 |
| Mid-continent (low gravity) | .85 |
| **Gulf Coast.** | |
| Gulf Coast, Grade A | $1.25 |
| Gulf Coast, Grade B | 1.05 |

## GAS OILS.

| | |
|---|---|
| Gas Oil, Bayonne, bulk gal. | 5¼ to 5½c |
| Gas Oil (32-36) Oklahoma, gal. | 3 to 3⅛c |
| Gas Oil (32-36) Gulf Coast, gal | 3¾ to 4 c |

## PIPE AND FITTINGS—CAST IRON GAS PIPE.

(By Courtesy Iron Trade Review.)

| | |
|---|---|
| Four-inch, Chicago | $59.20 to $60.20 |
| Six-inch and over, Chicago | 55.20 to 56.20 |
| Four-inch, Birmingham | 54.00 to 55.00 |
| Six-inch and over, Birmingham | 50.00 to 51.00 |
| Four-inch, New York | 69.60 to 71.60 |
| Six-inch and over, New York | 64.60 to 65.60 |
| Standard fittings, Birmingham, base | 115.00 |

6 to 24-inch, base; over 24-inch, plus $20; 4-inch, plus $20; 3-inch, plus $20.

## BY-PRODUCTS

(By Courtesy of Oil, Paint and Drug

| | |
|---|---|
| Ammonia aqua, 16 deg. drums lb. | 5 to 5¼c |
| Ammonia aqua, 20 deg. drums lb. | 6¼ to 6½c |
| Ammonia aqua, 26 deg. drums lb. | 6½ to 7 c |
| Ammonia squa, anhydrous cylinder, lb. | 30 to 36 c |
| Ammonium sulphate, bulk F. O. B. Works, per 100 lbs. | $2.60 to $2.65 |
| Potash prussiate, yellow casks, lb. | 17 to 17½c |
| Potash prussiate, red casks, lb | 37 to 38 c |
| Soda prussiate, yellow casks, | 9½ to 10 c |
| Soda sulphocyanide, barrels, lb. | 45 to 55 c |

## COAL TAR BASIC PRODUCTS.

(By Courtesy of Oil, Paint and Drug Reporter)

| | |
|---|---|
| Benzol C. P. tanks, works, gal. | 24 to 25c |
| Benzol, drums, gal. | 30c |
| Benzol, 90% tanks, works, gal. | 23c |
| Benzol, 90% drums, gal. | 28c |
| Napthalene, flake, barrels, lb. | 4½ to 5 c |
| Napthalene, dyestuff bags, lb. | 4½ to 5 c |
| Solvent Naphtha, water white works, gal. | 24 to 25c |
| Solvent Naphtha, drums, works, gal. | 29 to 30c |
| Toluene, C. P. tanks, works, gal. | 31c |
| Toluene C. P. drums, works, gal. | 36c |

# Public Ownership of Public Utilities*

## A few of the outstanding benefits to be derived by both parties to the undertaking

*George L. Myers*

Assistant to the President, Portland Gas and Coke Company, Portland, Oregon

IT IS pertinent to point out the contrast between the interest involved by reason of the investment in property under conditions of private ownership and government ownership. In the case of private ownership there is a widespread distribution of interest represented by investment and a greater local interest among the people of most modest means. In the case of government ownership there is neither as wide a distribution of interest by reason of investment, nor is there as great a local interest.

Furthermore, not nearly as many people of modest means are interested. This is attributable to the fact that the money invested in the property of governmentally owned utilities is represented in bonds owned by people generally of large means, more of whom live outside the territory of service than is the case under conditions of private ownership. The ownership of these bonds is thus more generally confined to the long established centers of wealth. This condition has been exaggerated by our present laws governing taxation.

### Utility Securities Do Not Appeal to the Very Rich

A recent study of the investment situation in its relation to taxation, conducted by the Chicago Tribune, has developed the fact that no person with an income so large that the Federal surtax reaches 3 per cent can afford to buy a long-term 8 per cent security in preference to a 5 per cent tax exempt bond. This, the Tribune says, automatically limits the market for public utility securities to the class of people with incomes of $10,000 or less. The wealthy class is out of the market for these securities. The money must come and is coming from the rank and file of our people. The tax situation has not only made public ownership of securities a necessity, but has served to intrench it as an accepted policy in public utility finance.

### The Benefits Derived from Public Ownership

The benefits accruing to the industry by reason of the public ownership of securities are most significant in their influence upon public relations, finance and employees.

The prospective investor generally seeks to become informed of the facts about the property in which investment is contemplated. The investment in securities establishes a material interest in the property of which the securities are evidence of participation in ownership. This material interest naturally creates a desire to become possessed of an understanding of the facts about the operations of the property and the industry of which it is a part and also gives rise to concern with reference to their problems and progress. The important consideration is that the material interest established makes for a mind receptive to and solicitous of information. Our principal difficulty in bringing about an understanding of the facts is to get a hearing. When a person puts his money into a business, irrespective of the form that the investment of it may take, there is, as a rule, an incentive either to seek or take careful note of information about that business. The facts about our industry when understood are of a nature to command a constructive attitude and it is this sort of attitude that serves to protect it from unfair and unwarranted attacks by designing politicians, the uninformed and those of preconceived prejudices.

### Consummation of Sales of Securities Only Beginning of Closer Contact

It is especially important to bear in mind that a sale once effected does not end the point of contact with the investor. It has only begun insofar as the public relations aspect of public ownership of securities is concerned. The interest created must be maintained and to do so means that the investor must be kept constantly informed of the facts relevant to his investment. This can be done by getting the facts before the investor indirectly through the various mediums of publicity and directly through communication with him and by establishing a personal contact en masse wherever circumstances make it possible to do so.

### Basic Character of the Industry

Our industry has the same justification for financial support from its community as any other industry in its community. In fact, it may be well maintained that it and the other classes of public utilities have a preferable justification. No industry in the average community is more basically essential to the community's economic progress. The property of no other industry becomes more permanently identified with the community in its physical characteristics. Once it is established, it is here to stay. Its property becomes almost as fixed as the land itself because most of it is immobile and not readily susceptible of conversion to other uses.

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*Abstracted from an address delivered at Gearhart, Oregon, June 25, 1924.

It has a permanent and increasing purchasing power in the community in meeting the needs for materials in its operations and in making additions and improvements to its property. It provides a permanent and increasing purchasing power on the part of labor in its community through its disbursements in the payment of salaries and wages. It contributes with permanency and in ever increasing amount to the support of government in the payment of taxes. It is well to substantiate the growing importance of our public utilities by citing the volume of investment now being made.

### Investment in Public Utilities Very Great

During the first quarter of this year financing in the sale of securities amounted to almost $300,000,000, an amount which, if maintained throughout the year, would exceed $1,000,000,000. This is considerably in excess of the financing of our railroads for the quarter and more than double that of our iron, steel, coal, copper, oil, equipment, rubber and shipping industries combined. When the fact is taken into consideration that practically every dollar obtained is spent in the communities served by these utilities and that the number of dollars thus spent is constantly increasing by reason of the increased volume of expenditures in materials, labor and capital charges because of increased volume of business and an enlarged investment of capital in property, this influence upon the economic stability and progress of the communities is obvious.

Experience under conditions of public ownership of securities has produced certain economic benefits of outstanding significance to the public and the utilities.

### Practice of Thrift Encouraged

It has encouraged the practice of thrift and has been conducive to the development of a greater civic pride in their public utilities in those communities whose people have become more generally interested financially in their utilities. It has opened up new sources of capital. It has facilitated the securing of needed capital and it has stabilized the market values of public utility securities. The credit position of our public utilities has consequently become materially strengthened. This has been the result of a more widespread distribution of securities and a more common ownership of the securities of our public utilities among the territories served. There is no factor more contributory to financial strength than local confidence demonstrated by tangible interest. There is nothing that makes for greater popularity of securities than widespread distribution. Consequently, capital can be more readily obtained and at less cost. In this result there is advantage to the public and the utilities. There is a greater reward to those who must take the risks of management and investment. It provides a greater incentive for expansion. The ability to obtain capital for additions and improvements to service is enhanced. The demands for service can be thereby more readily met and the utility thus become better able to improve and advance the domestic and industrial life of its community. A greater opportunity is offered to build up the volume of business, which ultimately leads to a lower cost of service to the user.

### The Market for Public Utility Securities

During the past few months the market price of industrial stocks has been on the decline. That of public utilities has been upward. This has taken place regardless of the general business situation, which has been of a nature to depress rather than enhance the market value of stocks. The favorable position of public utility stocks can be attributed in some considerable measure to the scope and nature of the distribution of utility stocks because of sales under the public ownership of securities plan.

### The Advantages of the Customer Ownership Campaign Through Employees

Both the companies and the employees have benefited where sales of stock under the public ownership of securities plan by employees have been in effect. They have benefited both by reason of sales activities on the part of their employees and investment by them in their stocks. The employees to sell successfully are obliged to become conversant with the facts about their companies. As they have been interested in making sales they have acquired these facts either as they are provided by the companies under given forms of providing information or by acquiring information upon inquiry because of their experiences in endeavoring to make sales. The companies in imparting information to employees have brought them together for that purpose and under these circumstances they have not only become informed by the facts given them, but have established an acquaintanceship and personal contact of educational and social value to them, which undoubtedly has proved to make them better satisfied with their employment and made their service with their companies of greater value because of their ability to inform the people with whom they come in contact.

### Purchase of Stock by Employees

The purchase of stock by employees by outright purchase or on the time payment plan has contributed to the practice of thrift and has naturally made employees generally more interested in their companies, and as a result more disposed to absorb information that is made available to them and to seek it. Employees who become owners of stock are more likely to be permanent in their service, with a consequent reduction in labor turnover.

It is my conviction that the industry can build on no more secure a foundation in establishing satisfactory public relations than to get the public to have a material interest in its progress and welfare. The more the ownership of our public utilities rests upon the general citizenship the greater and more permanent will be the disposition to deal fairly with them.

# Final Committee Reports

## A. G. A. Convention

### INTERESTING STUDENTS IN INDUSTRIAL GAS

**Report of Educational Committee**

**J. P. Leinroth, Chairman Public Service Elec. & Gas Co., Newark, N. J.**

The Educational Committee of the Industrial Gas Section submits the following thoughts to you for interesting students in the industrial gas field. This question in addition to the attention that it has received at the hands of this committee, was discussed very earnestly and at length at the March 25th meeting of the Managing Committee of the Industrial Gas Section at Chicago. A motion was passed at the end of this discussion to the effect that the thoughts expressed at this meeting on the subject be passed on to the General Educational Committee for their earnest consideration.

It is the opinion of this committee as well as that of the Managing Committee of the Industrial Gas Section that this problem is one of great import to us. It is far reaching in that it includes, besides the problem of interesting the student in entering the industrial gas field, the problem of educating these students, many of whom will become factory executives with whom we will come in contact, in the manifold advantages of gas as an industrial fuel. It is obvious that if this latter class have a knowledge of the industrial advantages of gas, the path of the industrial gas engineer will be much smoother. With these facts in mind, this committee recommends the following:

#### The Recommendations

1—It is agreed that at the present time both the average student and professor are not enthusiastic as to the possibilities of the gas industry. To inject this enthusiasm seems to be our starting point and it is idle to expect big results from any other activities along these lines until we "sell" the idea of gas. We must show the great possibilities of the industrial uses of gas and of the gas industry in general, and we must get men to address meetings who will stress these possibilities and not so much the mere technique of the industry. We must point out to the student the fact that there is a real opportunity for him in our industry. The speaker must, above all, be an enthusiast. It is felt that we have not been enthusiastic enough about the industry in our talks to them and we must not overlook the psychological effect that we can create by these lectures. Before we try to establish courses in the various schools we must first create a demand for them by working up this enthusiasm.

#### Competitive Prize

2—A yearly competitive prize should be offered by the American Gas Association to interest the students and incidentally the professors of the technical schools in Industrial Gas, the subject being the "Application of Gas to Industrial Processes." This prize would be open to any student in any college, university or technical school. This would be a very concrete way of interesting a number of engineering students throughout the country in our industry and it would be logical to expect as a result that a greater number of such students would seek their opportunity in the industrial field.

3—An effort should be made to tie in with the student engineering societies, such as the American Society of Mechanical Engineers and American Institute of Electrical Engineers, which have been established in a great many of our technical schools. By offering them a lecture once or twice a year an excellent opportunity would be given us to tell our story.

#### Outlet Provided for Students

4—We must provide an outlet for these students and make it known to the college and university authorities that there is a real demand for them in the gas industry.

5—The practice of taking on college students during their summer vacation period is thought to be an excellent way of interesting the right type of men in the industrial gas field.

6—The magazine "Industrial Gas" should be sent to the various technical schools so that they are on file in the library and available to the student. This is being done by some of the gas companies and it is hoped that this practice become more common.

Respectfully submitted,
Educational Committee,
Industrial Gas Section.
F. F. Cauley,
E. G. DeCoriolis,
J. P. Leinroth, Chairman.

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### Market Materially Strengthening

George D. Roper, president of the George D. Roper Corporation, Rockford, Ill., said:

"My observation leads me to believe that the present conditions all point to material strengthening of markets. This means, as I see it, that fundamentally conditions today are much better by far than a year ago.

"Our experience with a large number of gas company sales and merchandising departments shows us conclusively that the gas companies are making rapid strides. If a general effort is exercised by the gas companies, no competitive lines need to cause them any apprehension."

# THE WORK OF THE INDUSTRIAL GAS SECTION

## Industrial Section Must Convince Gas Industry of Value of the Industrial Business

By H. H. Clark

In looking for words properly to present the work of the Industrial Gas Section, I made a comprehensive survey of everything I could read about Industrial Gas and found that the subject is more than 25 years old.

While the subject of Industrial Gas is an old one, our viewpoint has changed considerably, so that what we called industrial gas business 25 or 15, or even five years ago, is not the same as the industrial gas business of today.

Neither has the gas industry as a whole the same viewpoint that it had 25 or 15, or even five years ago. Today we see a vast market for our product wherever heat is used.

And in supplying this market with heat in the form of gas, we are performing a service to mankind by the conservation of one of our most valuable natural resources, i. e., coal.

### Conservation of Coal

The raw material we use in the form of coal yields valuable by-products such as gas, coke, benzol, tar and ammonia, which would be lost if the coal was burned to produce heat direct. By first converting the coal into gas and by-products, we not only save these valuable materials, but the gas which is made in the process will deliver more useful heat when burned than the original coal would have delivered if burned as coal. This is because gas has more than twice the efficiency of coal in the average heating operation.

Heating business is most desirable from the gas company's viewpoint. Industrial gas users of the larger class, such as the steel industry, ceramic industry, automobile industry, packing industry, etc., use our product—gas—on an average of 60 per cent of the time throughout the year, subject to a variation of about 20 per cent above or below this, depending on how business is with them.

Compare this 60 per cent with our domestic customers, who use gas for cooking, water heating and laundry purposes. This type of customer uses our product only 16 per cent of the time during the year.

Commercial users such as hotels, restaurants, bakeries and newspapers use our product 28 per cent of the time during the year.

House heating by gas, which is becoming more popular every year, as its great comfort, convenience and cleanliness is realized, uses our product about 20 per cent of the time.

### Division of a Gas Company's Business

A broad estimate of the business now being done by the gas companies in the United States in the communities in which they are now serving would look like this:

They are doing about 50 per cent of the possible domestic business, such as cooking, water heating and laundry (80 per cent of the cooking, 20 per cent of the water heating).

They are doing about one-tenth of 1 per cent of the house heating business, where gas is the only means of heating.

They are doing about 70 per cent of the commercial business, such as hotels, retaurants, newspapers and bakeries.

They are doing 10 per cent of the large industrial business. This figure varies greatly. In some communities they do no industrial business, while in other communities gas companies are pushing this branch of the business and have as much as 30 per cent of the available business on their lines.

### Growth of Gas Unlimited

A study of these figures will convince the most skeptical that the future growth of the gas industry is unlimited, or, to put it another way, its growth will be limited only by the amount of new capital we can get to enlarge our facilities to serve the needs of our customers.

And, strange as it may seem, these new and larger fields for gas heating are more profitable than the present field of domestic service, which represents from 75 to 85 per cent of the load of the average gas company today.

While the profits are not in proportion as 60, 28 or 20 is to 16, still the turnover is there, and a large volume for a small profit is better business than a small volume for a large profit.

To illustrate in another way: Suppose a gas company desires to increase its gross income from the sale of gas by $500,000 a year. To get this income from new domestic customers would require the addition of 20,000 customers to the lines with an investment of about $2,500,000 for plant, mains, service and meters.

To get this additional income from new industrial customers would require the addition of only 140 industrial customers of average size, with an investment of less than $1,000,000 for plant, mains, service and meters. I have known instances where one industrial customer has bought $250,000 worth of gas a year, and I expect to hear of larger ones in the near future.

Obviously, the overhead on 140 industrial customers is considerably less than on 20,000 domestic customers.

### Gas Section

It is the desire of the Industrial Gas Section to point out to the gas industry:

1st—The desirability of the Industrial Gas Business.
2nd—What it is.
3rd—Where it is.
4th—How much there is.
5th—What it costs to get it.
6th—How to get it.
7th—How to hold it after you get it.

And our program and publications are presented with these objects in view.

As the youngest section of the American Gas Association, we feel proud of our progress to date and look forward with much interest to the wonderful future of the new gas industry, and to the part we will play in its tremendous growth; which growth will be greater in the next ten years than in the past hundred.

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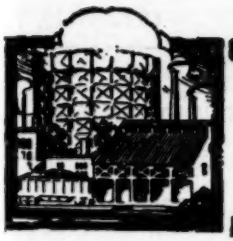
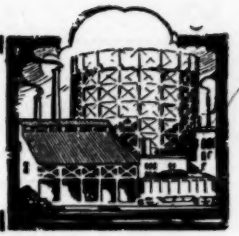
Read at the meeting of the Industrial Section, A. G. A., Atlantic City Convention, Tuesday, October 14, 1924.



# NEWS OF THE GAS INDUSTRY



George D. Roper Corporation, Rockford, Ill.—Roper ranges were conspicuous in a liberal setting of flowers and palms at a commanding corner of the big hall.

National Stove Co., Lorain, O.—Featured direct action elastic oven with celebrated Lorain regulator; enabling the housewife to accommodate herself to large or small requirements. Lorain red wheel, regulating oven temperature, interests visitors much.

Metric Metal Works, Erie, Pa.—Iron case meters, for which the manufacturers claim permanent accuracy, durability, convenience of handling, varied choice of connections and low cost of upkeep. Demand limiting meter exhibited with actual connections in the most practical way, with cross-section showing inside working parts.

Milwaukee Gas Specialty Co., Milwaukee — Rutz press-the-button and swing-type gas range lighters made by this concern were seen in every stove exhibit on the Pier. Company's own booth devoted to reception of visitors.

McWane Cast Iron Pipe Co., Birmingham, Ala.—McWane precalked pipe and conduits cast in green sand for services and small mains.

Maryland Meter Works, Baltimore—Demonstration display of "B" and "C" meters very interesting to trade.

Lattimer Stevens Co., Columbus, O.—Double booth permitting an effective display of meters and accessories.

E. J. Lavino & Co., Philadelphia—Varied products of these refractories, led by Lavino oxide, displayed and chemically demonstrated.

Wm. M. Crane & Co., New York—Showed a complete line of domestic and hotel ranges. They also showed a heat recording device which indicated the efficient of gas used in the Crane type of range.

Radiant Heat Corporation of America, New York — Artistic demonstration of Kennedy radiant heaters, with delightful picture of a home interior and original poster effects.

Reliable Stove Co. Div., Cleveland—Its Reliable angle-iron gas ranges, with famous Lorain oven heat regulator, on view here; also Reliable Golden Glow gas heaters. Slogan of Reliable Division for 1925 is "Bigger and Better Gas Appliances."

Pittsburg Water Heater Co., Pittsburg — This booth was a high light of the exhibition. General admiration for its running fountain of never-failing hot water, running from a lion's mouth into a basin. Background was a copy of a Maxfield Parrish painting. Animated manikin raising a series of cards describing the Pittsburg heater was popular and effective.

Pittsburgh Meter Co., Pittsburgh—Presenting types of the Westinghouse positive, orifice and ironclad meters; and the Keystone oil meter was also shown. Full line covers everything in meters.

Pennsylvania Engineering Works, Newcastle, Pa.—Showed big photo of Keystones with monogram and motto, "The Keystone of Service."

Western Gas Construction Co., Fort Wayne, Ind.—Beautifully illuminated exposition of the Clover-West vertical retorts.

U. G. I. Contracting Co., Philadelphia—Chief feature was the Automatic Control for water gas apparatus. This company originated the automatic control system. Next was the exhibit of an acetylene and oxygen cutting and welding outfit. Examples of the general engineering ond construction work of the U. G. I. were seen.

U. S. Cast Iron Pipe & Foundry Co., Burlington, N. J.—Offered a bronze welded joint for piping.

Nathaniel Tufts Meter Works, Boston—Demonstration of the accuracy of consumer meters made by this factory. Use and care of such meters according to the system of the Four Cardinal Points.

Steere Engineering Co., Detroit—Large photographic background illustrating installations made by the company in leading gas plants of the country. This included the Backrun apparatus put into the Atlantic City Gas Works.

Superior Meter Co., Brooklyn—Varied exhibit of meters and meter parts; American flag in metal as a decoration was a marked novelty in this booth.

National Tube Co., Pittsburgh—High spot of this considerable display was taken up by the National Welding Scale-Free piping, the advantages of which are clean and smooth surfaces inside and out, reducing to a fraction any tendency to corrosion or pitting. Specially desirable for gas stove uses as lending itself to enameling and nickel plating. Samples here, too, of coated pipe, interesting to gas manufacturers in view of discussions at present convention. Exhibits of Matheson joint pipe.

The S. B. Sexton Stove & Mfg. Co., Baltimore—Centerpiece of this solid display was a heavy hotel and institutional range in three sections built of polished blue Armco iron. There was a showing, too, of Excelsiors and Sextons and steam tables in various colors and sizes.

Sprague Meter Co., Bridgeport—Its well-known makes represented without fuss or feathers, but quiet dignity and modesty.

Safety Gas Main Stopper Co., Brooklyn—Here, as usual, with their well-known standard bags, stoppers and plugs and a new pipe-cleaning brush which was a young sensation at the show. Patrick Goodwin and James McKee on the job.

Roberts & Mander Stove Co., Philadelphia—This company's new Range No. 2437 was a novel departure in the construction of main front, type of door and method of door-fitting with completely new arrangement of door springs. Front has no exposed bolts and entire range is designed with rounded corners, giving a pleasing effect. The toe of the leg presented flat surface to linoleum floor, avoiding damage to kitchen floor coverings. All burners of U. S. Bureau Standard.

P. H. & F. M. Roots Co., Connersville, Ind.—The big feature here was the Roots dry gas meter, taking about one-twentieth the space occupied by the ancient rotary gas meter used by gas companies. Constructed on the same principle as the Roots gas exhausts. Of intense interest to manufacturers because of great economy, both in space and power. The flow of gas in the mains is what drives this machine.

Surface Combustion Co. and Combustion Utilities Corporation, New York—Largest industrial exhibit in hall. Extremely varied and attractive. Showing complete line, from a small coffee urn burner up to the latest development of the oventype furnace, using a combination of recuperation for heat recovery, plus surface combustion, single valve control for accurate and positive control of combustion. Featuring the Thrift oven, the oil gas burner and general Blue Line furnaces. Doherty emblem in electric lights. Complete service to gas industry emphasized. Industrial surveys stressed in a series of fine booklets.

Connersville Blower Company, Connersville, Ind.—One had to travel quite a way to see their big red blower at the far end of the exhibition hall, but the trip was worth it, and the men in charge were most willing to demonstrate its service qualities. Exhausters, boosters, meters, blowers and pumps are the outstanding features of the Connersville line.

Hoffman Heater Co., Lorain, Ohio—Hoffman had a complete line of water heaters on show at the exhibit, featuring a new type of burner which has been creating a deal of comment in the trade. This is no secret and the line is worth mentioning even if none of the famous Hoffman cigarettes were forthcoming on the writer's visit to the booth.

Equitable Meter Company, Pittsburgh, Pa.—The "Emco" line of meters and regulators for artificial and natural gas was well displayed in an attractive booth at the convention exhibit.

American Stove Company, St. Louis, Mo.—Dangler Stove Company Division, George M. Clark Co., Chicago, Ill.; National Stove Company, Lorain, Ohio; Quick-Meal, St. Louis, Mo.; New Process Stove Co., Cleveland, Ohio, and Reliable Stove Company, Cleveland Ohio.

This great organization had an attractive series of booths well arranged at the pier end of the exhibition, with a constant stream of visitors. The various lines were well displayed and the picture service of the parent organization was featured in a special exhibit at the end booth, with examples of their advertising service for publications and vehicular displays.

Ash Reclaiming Machinery Corporation, New York City—The "Kolumbus" reclaimer, for partly burned coke, working on the principle of separation by flotation and two screws, was the company's display at the exhibit. It is something quite different in the industry and its economy and efficiency are notable.

Gas Purifying Materials Company, Long Island City, N. Y.—Photographs and a bowl of oxidized iron scraps featured this exhibit of a product difficult to portray at best. Mr. Klein was on hand with a genial smile to solve the troubles of the gas men who came his way.

Commercial Gas Appliance Co., Baltimore, Md.—Paul Frame and James Tyson were on the job explaining the Acme flue, a "different sort of thing," for keeping the wall back of the stove clean. It solves the problem of the clean kitchen by catching the burnt particles carried off in the gas range exhaust in a steel wool flue at the back of the stove, which is draftless and stops the heat.

Improved Equipment Company, New York City—The "Improved" Horizontal Gas Ovens of this organization were well pictured in their booth at the exhibit, in charge of Messrs. Kurfman and Barkley, who explained their fuel economy, high gas yields, high coke yields, high tar and ammonia yields, moderate cost and long life on low maintenance cost and minimum labor requirements.

Koppers Company, Pittsburgh, Pa.—Coal gas plants of many varieties is this company's specialty. They had a staff of men on the job to talk to interested visitors to their booth at the convention.

Bartlett Hayward Company, Baltimore, Md.—There was a continual crowd at the Bartlett Hayward booth to see the two or three devices that this organization had on show. One was a miniature waterless gas holder, rather novel in its operation. Their fool proof gas control system was also being demonstrated continually.

A-B Stove Company, Battle Creek, Mich.—A-B had a most attractive display, attained at considerable trouble. From the light colored rug on the floor to the very topmost board of the partition all was in harmony and it was a pleasure to stop there and examine the A-B products.

American Meter Company, New York City—A single great specimen of their product took up all of one side of the American Meter's booth. This brightly polished instrument gave clear indication of all the claims which the company makes for it.

General Gas Light Company, Kalamazoo, Mich.—A display of Radiantfire heaters in well-constructed mantelplaces, combined with a series of beautiful oil paintings of the way these heaters fit into homes, served to make this organization's display attractive.

Gas Machinery Company, Cleveland, Ohio—Their new automatic water gas control was on display at the exhibition with a corps of efficient demonstrators explaining its working to the continual stream of visitors.

Isbell-Porter Company, Newark, N. J.—The line of this engineering firm was well pictured in their display booth, and they were so busy making sales that the writer was unable to get them to waste even a few moments' time describing the line.

A. E. Acheson, Jersey City, N. J.—Thirty years of experience in the gas industry have made A. E. Acheson an expert in the manufacture of fire brick, coal gas benches, clay and silica retorts and settings, furnace, water gas and cupola linings; refractory cements and plastic fire brick.

C. M. Kemp Mfg. Co., Baltimore, Md.—Burning gas under water was a rather novel stunt performed at the Kemp booth a hundred times in the display of their automatic gas system, a fool proof and deterioration proof combination. A great variety of burners showed the high heating quality of the gas and air mixers.

Cruse-Kemper Company, Ambler, Pa.—Under the direction of S. E. Fairchild, Jr., president of the organization, the results of the gas holders erected by this company and pictured in the booth were pointed out to the visitors who came to this young industrial art gallery.

American Schaeffer & Budenberg Corp., Brooklyn, N. Y.—Recorders, gauges and thermometers of a dozen or more different sorts were on display at the booth of this company in charge of a group of men who knew their products and the possibilities of the instruments thoroughly.

Cleveland Gas Meter Company, Cleveland, Ohio—The company had an attractive booth showing a complete line of their meters. Mr. Knight and Knight, Jr., agreed that Cleveland gas meters have built a reputation for the past three decades.

Baltimore Gas Appliance & Mfg. Co., of Baltimore, Md.—Showing stoves with a series of new and novel improvements. A broiler which can be adjusted to any height above the flames, a special heat regulator, a drawer in the stove for cutlery needed in cookery were features of the convention display.

C. L. Bryant Boiler Co., of Cleveland, Ohio — Twenty-one years of experience in the gas business made C. L. himself so busy that it was practically impossible to find out what he was selling because he was so busy taking orders from people who knew his garage heater and other house-heating devices.

Hays Manufacturing Co., of Erie, Pa.—The fine points of the gas industry, the little things that mean so much, were the features of this organization's well-equipped booth at the convention exhibition. Tapping machines, service boxes and stop cocks of a hundred different sorts were in charge of Mr. Neubert.

Acme Brass Company, Detroit, Mich.—D. H. Hamilton, a most pleasant sort of person, was in charge of this company's exhibit. He was at great pains to tell all who passed the worth of the Acme line of gas cocks, all in full compliance with A. G. A. and U. G. I. specifications.

American Gas Furnace Company, Elizabeth, N. J.—Furnaces and equipment for a large variety of industrial purposes were on display at the booth of this company. Hardening and annealing metals of different sorts are the specialty of these machines and high speed steels one of the end-products.

Combustion Utilities Corporation, New York City—This great organization went to considerable pains to make their working exhibit one of the outstanding features of the convention. A new style institutional oven presided over by N. C. Rasmussen, its inventor, and a pleasant-faced young woman made delectable table dainties available at all hours.

James B. Clow & Sons, Chicago, Ill.—An attractively arranged booth for the rather prosaic iron piping of this company was aided at the exhibit by the cheerful smiles of willing explainers, who were ready to go into details proving the superiority of the Clow line.

## EDITORIAL NOTE

**The above is a very brief description of only a part of the exhibition booths on the Steel Pier. We regret that space does not permit us to describe every one of them. Every booth showed evidence of the great care that had been taken to make them attractive, with the result that the exhibits this year surpassed those of any other exhibition of the American Gas Association, and we venture to say that no other industry at their annual meeting presented so attractive a display throughout as this year's exhibition.**

Riter-Conley Co., Pittsburgh, Pa.—Mr. Sanford and a number of assistants were on hand to explain to gas men the excellence of Riter-Conley products.

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Stacey Bros. Gas Construction Co., Cincinnati, O.—Booth was presided over by P. C. Rodgers, eastern sales manager, and the booth was fixed up as a cozy corner and resting place.

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Welsbach Co., Gloucester, N. J.—Had attractive booth and showed a complete line of room heaters.

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West Gas Improvement Co. of America, New York — Showed charts of their various plant equipment and an illuminated section of a West Vertical Retort.

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American Atmos Co., New York—Showed a complete line of first aid apparatus in an attractively arranged booth.

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C. W. Hunt Co., Inc.—A full-size Mitchell Electric Vibrating Screen made Booth 208 the focal point for gas men on their way to and from the convention hall. The advantages of the Mitchell for screening and re-screening coke were fully explained to interested listeners by Mr. Woodward, Geo. K. Jenckes and Percey L. Moore, in attendance.

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General Specialty Co.—Eight mahogany colored posts connected by heavy green silk rope, each post surmounted with a full nickeled Imperial Gas Iron, enclosed Booth 78. The crowning attraction was a 14-karat gold-plated Imperial Gas Iron, mounted on a green plush base in a glass cabinet, which attracted the attention of every one passing that section. Mr. Bloom demonstrated the advantages of the "Seven Exclusive Features" of the Imperial.

## Atlanta Co. Gas Rate Decision

Atlanta, Ga.—The Atlanta Gas Light Company lost the first skirmish in the fight to secure higher rates here recently when Cam Dorsey, standing master for the Federal District Court, handed in a decision stating that the present rate of $1.55 per thousand cubic feet was not confiscatory, but represented a fair return on the value of the company's property.

In his decision Standing Master Dorsey stated that the present value of the company's property should be placed at $8,000,000, instead of the $5,250,000 claimed by the Public Service Commission, and that the basis for rate-making should be based on the replacement value of the property rather than upon its original value plus the value of extensions and improvements.

If this principle is adhered to, the gas company may be able to petition the Public Service Commission and secure a new and higher rate later upon the new basis of valuation.

In which respect the company may have gained an ultimate victory through an immediate defeat.

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## Resolution Adopted in Memory of Carl Hauschildt

Davenport, Iowa—Whereas, God in His wisdom has taken from us our well-loved fellow-employee and friend, Carl Hauschildt, and

Whereas, we, his fellow-workers, have lost a loyal friend, and his employers a faithful and capable employee,

Now therefore, be it resolved, that the undersigned, the gas plant superintendents of The United Light and Power Company, hereby extend to Mrs. Hauschildt and her sons their sincere sympathy in this great loss.

(Signed): Frank A. Bush, J. W. Pullen, Thos. Suchomel, Fred C. Bierman, J. O. Benway, Bert Schultz, T. L. Connor, R. E. Tunwall, W. J. McElroy.

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## Another Municipal Plant Quits

Another municipally owned electric plant in Oklahoma has been shut down and transmission line service substituted for local generation of current. The town of Paden has closed its electric plant and connected its distribution system to the lines of the Oklahoma Gas and Electric Company. Sixty-three thousand volts carried on the transmission lines supplying the town are reduced at the local sub-station, from which the local lines carry current to the city's customers.

Operation of the lines serving Paden has been placed under the central division of the company with headquarters at Sapulpa.

Twelve cities and towns in Oklahoma have abandoned operation of city-owned electric plants to take current from Oklahoma Gas and Electric Company's transmission system.

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STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF AUGUST 24, 1912, OF AMERICAN GAS JOURNAL.

Published weekly at New York, N. Y., for October 1, 1924.

State of New York, County of New York, ss.: Before me, a notary public in and for the State and county aforesaid, personally appeared Stanton G. Krake, who, having been duly sworn according to law, deposes and says that he is the President and Treasurer of the American Gas Journal and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management, etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 443, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are:

Name of Publisher—American Gas Journal, 53 Park Place, New York. Editor—Ismar Ginsberg, Far Rockaway, N. Y.; Managing Editor, Stanton G. Krake, 319 Washington Ave., Brooklyn, N. Y.; Business Manager—Stanton G. Krake, 319 Washington Ave., Brooklyn, N. Y.

2. That the owners are: American Gas Light Journal, Inc., 53 Park Place, New York, N. Y.; Elbert P. Callender, Palo Alto, Calif.; Stanton G. Krake, 319 Washington Ave., Brooklyn, N. Y.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: None.

4. That the two paragraphs next above, giving the list of stockholders and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

STANTON G. KRAKE,
Business Manager.

Sworn to and subscribed before me this 24th day of September, 1924.

ADELAIDE DE LOCA,
(Seal)

(My commission expires March 30, 1925.)